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Vol. 16, No. 7 July 1997

Monitoring Times®

Your Personal Communications Source

Printed in the United States

Pluvlow in the desert

Area 51

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iCan Reaction Tune Another Receiver!

Reaction Tune the NEW ICOM IC-R10

Use the OptoLinx for computer controlling the ICOM IC-R10 $129.00

Computer Not Included

Another radio to tune, another reason to purchase the *Scout*.

Until now the AOR AR8000/2700 were the only hand held scanners to take advantage of the ***Scout's*** Patented Reaction Tune function. The Scout can now tune the new ICOM IC-R10 hand held scanner (shown below). Connection is easy: No modifications required - No custom cables to buy - Just plug and play.

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- 16 segment RF signal strength bargraph
- Frequencies are automatically saved when unit is turned off
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$449 Includes Scout, DB32 Antenna, CC30 Case & Spectrum CD

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Radio Not Included

Scout with ICOM IC-R10
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Monitoring Times™

Vol. 16, No. 7 July 1997

Cover Story

Phantom in the Desert

By Larry Van Horn

Area 51 — Is this elusive air base a figment of the public's over-active imagination? Very far from it! The areas of Nellis Air Force Base dedicated to Special Projects are home to some of the world's most highly guarded military secrets.

The area is also a Mecca for military communications enthusiasts. A year and a half of research have gone into this report on the agencies and frequencies being used in this high desert area northwest of Las Vegas. Much as the military may protest that it is just a phantom, and contrary to a recent magazine story regarding its projected closure, Area 51 is very real and very active. But let the story starting on page 8 convince you: we don't advise you try to go there.

CONTENTS

Reviews:

The big news this month is the arrival of the BC235XLT TrunkTracker scanner. Bob Parnass found that, despite its similar appearance, it incorporates a number of improvements over the non-trunking BC230XLT. The trunk-following functions worked as advertised, and images and intermod were virtually non-existent. See page 94 for the full review, including measured sensitivity on VHF/UHF and VHF air band.

Icom's IC-R8500 general coverage receiver is tough, loaded with goodies, well-designed, and pleasant to listen to, says Magne, on page 92. It may well tempt the "'I want it all in one box' enthusiast who is convinced that four figures isn't too much to pay for a radio."

DEPARTMENTS

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Bearcat Intercepts Trunked Radio

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400 Channels · 20 banks · Twin Turbo Search/Scan Frequency Transfer · VFO Control · Automatic Store 10 Priority Channels · Selectable Mode · Data Skip Frequency step resolution 5, 12.5 & 25 KHz. Size: 2-3/4" Wide x 1-1/2" Deep x 7-3/8" High

Frequency Coverage:
25.000-549.995 MHz., 760.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 3000XLT is the ideal handheld radio scanner for communications professionals. This handheld scanner scans at 100 channels per second and searches at a rate up to 300 steps per second. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas. Selectable AM, Wide FM and Narrow FM modes allow you to change the default receiving mode of the BC3000XLT. For maximum scanning pleasure, order the following optional accessories: **UA502** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **LC3000** Deluxe swivel leather carrying case $34.95; **BP2500** rechargeable nickel-cadmium battery pack for up to five hours of dependable use $29.95; **ANTMMBNC** Magnetic mount scanner antenna with BNC jack and 12 feet of cable $29.95. **ANTSGBNC** Glass mount scanner antenna with BNC cable $29.95. The BC3000XLT comes with AC adapter, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Order today.

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Mfg. suggested list price $769.95/**Special $344.95**

500 Channels · 20 banks · Alpha numeric display Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High

Frequency Coverage: 25.000-549.995 MHz., 760.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 9000XLT is superb for intercepting communications transmissions with features like TurboSearch™ to search VHF channels at 300 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a selectable attenuator to help eliminate annoying intermodulation from adjacent frequencies in highly populated areas and selectable AM, Wide FM and Narrow FM modes that allow you to change the default receiving mode of the BC9000XLT. Other features include ***Auto Store*** - Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** - This feature lets you record channel activity from the scanner onto a tape recorder. **Hi-Cut filter** to help eliminate unwanted static noise. You can even get an optional ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **BC005** CTCSS Tone Board $54.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC9000XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty.

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Mfg. suggested list price $429.95/**CEI price $269.95**

300 Channels · 10 banks · Trunk Scan and Scan Lists Trunk Lockout · Trunk Delay · Extra battery & charger 10 Priority Channels · Programmed Service Search Size: 2-1/2" Wide x 1-3/4" Deep x 6" High

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The Bearcat TrunkTracker BC235XLT, is the world's first scanner capable of tracking a selected radio transmission as it moves across a trunked radio system. Now it's easy to monitor fleets and subfleets in analog trunked radio systems. The BC235XLT can also work as a conventional scanner. This 300-channel, programmable handheld scanner provides scanner users with uninterrupted monitoring capabilities of Type I, II, IIi and hybrid trunking systems. One of the biggest obstacles in the scanner industry has been the increasing use of trunking radio systems in business and public service agencies throughout the United States and Canada. This makes it nearly impossible to track a conversation as it moves within a trunk system from frequency to frequency. According to Ken Ascher, WB8LIT, Chairman & CEO of Communications Electronics, "The Bearcat 235XLT is a revolutionary breakthrough in scanner technology. Now it's easy to continuously monitor conversations even though the message is switching frequencies." The BC235XLT comes with AC adapter, CRX120 battery charger, two rechargeable long life ni-cad battery packs, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS and LTR systems. Call 1-800-USA-SCAN to order your scanner now.

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Cobra 29LTDWX-A CB with weather alert	$109.95
Cobra 2010GTLWX-A SSB CB Base (†$25.00 shipping)	$299.95
Cobra HH45WX-A Handheld CB radio with weather	$89.95
Maxon GMRS210+3-A GMRS transceiver/SPECIAL	$166.95
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E-mail Energizes the Hobby

What's your pleasure? Aviation monitoring? Listening to military or federal agencies and exercises? Mediumwave DXing? Or have you just purchased a TrunkTracker scanner and need to connect with other users in your area to figure out the subfleets and their codes?

Grove Enterprises, our publisher, has been offering a free service to the hobby by establishing a number of topic-specific e-mail lists. Here's how it works. Let's say you're interested in the **milcom** list — one of the most productive exchanges by active monitors to reside on any Internet server.

To get on the list (subscribe), send an e-mail message to *majordomo@grove.net*. In the body of the message, type two words: *subscribe milcom*. Turn off your signature (or type *end* on the next line): Send the message. Within minutes you should receive a welcome message (if you have done everything correctly). Whenever anyone posts a message to *milcom@grove.net*, it is automatically shared with all subscribers to the list. A reply to that message will also go to the entire list.

Whenever 100 messages have been logged in, the server automatically produces a "digest." If you prefer not to receive individual e-mail messages as they are generated, you can ask to receive only the digests when they are produced by typing *subscribe milcom-digest* in your message.

You can perhaps begin to imagine what can be accomplished by several listeners in different sections of the country, monitoring an unidentified shortwave utility signal and pooling their observations and speculations in near real-time. Larry Van Horn and numerous regulars in this group will vouch for the mysteries they have uncovered. The same results hold true for the well-established Worldwide Utility News club (WUN), and are anticipated for the newest lists now on line — fedcom, amfmtvdx, and trunktracker.

By the way, unlike most internet newsgroups these lists are privately "owned" and managed by volunteers. "Flaming" is not tolerated, and off-topic discussions are generally nipped in the bud. You'll find it a pleasant change and a great place to share radio information.

Here is a list of the groups currently being hosted on the Grove site and open to anyone:

acars	ACARS - on decoding aviation data
amfmtvdx	AM/FM/TV long-distance reception
code30users	Hoka Code 30 users
code3list	Hoka Code 3 and Code 3 Gold users
fedcom	Federal communications
hearsat-l	HearSat-l (receiving radio signals from satellites)
milcom	Military HF/VHF/UHF communications monitoring
scan-dc	Scanner radio topics in Washington-DC-Baltimore
wun	Worldwide Ute News Club (nonbroadcast SW radio)
trunktracker	TrunkTracker users group

Add "-digest" to any of the above to subscribe to the digest only.

For a list of commands used by the "majordomo" mailing list manager, put the word *help* in your message. For a general description of a particular group, type *info* and name of the list.

If you have e-mail access, we encourage you to give these groups a try, especially if you have no local radio club available to you. It's the next best thing!

One more thing: as TrunkTracker owners compile information on their local systems, these will be posted on a web page (**www.trunktracker.com**) maintained by columnist Rich Barnett. Check this site (and contribute to it) frequently for the latest information on how to program a TrunkTracker scanner for your area.

Mistakes in antenna article

There has been a lot of interest, as well as a lot of head-scratching, concerning the multi-resonant antenna article by Peter Barker, which appeared in the May issue. There were some typographical errors and some other numerical discrepancies, but what is most intriguing is whether the theory itself has merit.

Since the author lives in Mexico, it's not a quick consultation to determine the original concept and his experience with the antenna. But, we also thought the matter might turn out to be a good teaching tool in antenna theory if we turned the questions over to Clem Small. Should he accept this assignment, we'll hope to see some answers in "Antenna Topics" within the next few months.

Meanwhile, take the design with a grain of salt — although you can't hurt anything experimenting with the basic premise. To get you started, here are the most critical typos: p.20, col. 1 - formula should read **234**/284 - 8.56 feet; Table 2, distance from feed point for Stub B should be **18'10"**.

In Table 1, numbers for meter bands and our interpretation in megahertz (which we provided for the benefit of those readers not accustomed to the approximation of meter bands) are not exact equivalents; however, there appears to be a real problem with stubs C and D. All the measurements for D are basically correct, but for stub C instead. The numbers for stub D (9.5 MHz) work out to be 24 ft. 7 in. (749 cm) long, solder point 49 ft. 2 in. (1499 cm) from the feed point.

The questions that remain unanswered include, for starters: will this antenna work as an unbalanced long wire without a ground or counterpoise at the feed point? will it work as a resonant antenna with the stubs bundled together? how would it work if the stubs were to be spread like a log periodic antenna?

We'll look to Clem Small for his "take" on these and other questions; you are welcome to send him your input as well, c/o the *MT* address. This antenna obviously caught our readers' imagination (ours, too), and we apologize if the theory turns out to be flawed. But the story isn't over yet!

Be Good to Your Tree

Frank Carson passes along this hint if you consider following Clem Small's suggestion in his January 1997 column of using a tree as an antenna.

"When you use a tree as an antenna be nicer to the tree — use galvanized screws instead of nails. They cause less damage to the tree, and when you take them out, the tree can heal up a lot quicker. If you use a long enough screw, you'll also get more surface area of the screw into contact with the tree than a nail of the same size. We hang up feeders at my house on trees and my wife (who's a naturalist) passed this on to me."

Vacation Monitoring

Last summer Paul Currie, KE4TTH, of Chuluota, Florida, took a vacation to Maine with his wife, two teenage daughters, and "the all-important Sony ICF-2001."

"While on our trip I noticed that the car

(Continued on page 102)

You may not know our name . . .

but our history gives us away!

While the name RELM Communications (formerly Regency Electronics) may not make you think of scanners, it soon will. We're re-entering the scanner market with top-quality, professional scanners. With that goal in mind, we're excited to introduce the HS 200 portable scanner. The HS 200 covers 13 bands including aircraft and 800 MHz. Other features include:

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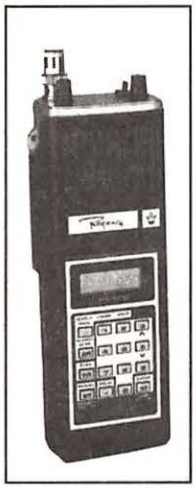

Pictured Right:
The HX 1000 was a popular scanner under the Regency Electronics name.

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Logger to Lager?

Oregon State University biologists had captured and collared a young northern spotted owl with a radio transmitter. Shortly after they released the endangered bird, they lost track of its signal. Deeply concerned that the little fledgling might have been captured or killed, a massive man- (or rather) *owl*-hunt was launched.

Concern mounted as the signal remained elusive. The search was widened into neighboring Washington state. Four months after the little owl was released, biologists once again began picking up the signal. Alarmed because the signal was coming from the Oasis Tavern in Skamokawa, federal law enforcement agents were summoned.

Probably imagining the little northern spotted owl chained to the bar, forced to perform cheap tricks for guffawing loggers, a raid was organized. When the group arrived at the Oasis, however, no owl was to be found. The radio signal disappeared again — until one of the owners turned on their electronic games. The "owl" turned out to be coming from an electronic dart board using the same frequency as the radio collar. The missing northern spotted owl remains on the run.

Reach Out for $2.8 Million

The last country in the world without telephone service has now made its first call. Tokelau, a tiny island nation of three coral atolls located 1,700 miles off the coast of New Zealand, spent $2.8 million for the privilege of being able to reach out and touch someone. Prior to the installation of phone lines, the island's 1,500 residents had to communicate through a noisy shortwave radio link or wait for the mail ship, which arrived once every five weeks.

The first phone call was from President Aliki Faipule Falime Teao to New Zealand Prime Minister Jim Bolger. Faipule Falima Teao thanked Bolger for anteing up $1 million of the money for the phones.

New Generation Samaritan

When 12 year old Sean Redden saw the "sob" and "pain" messages flashing onto the screen of his computer, he wasn't sure whether it was real or part of a game. Redden was in an Internet "chat room" called Glen Shadows Tavern, where visitors play make-believe, when a new character entered the room and said, "Hello, help me."

Everyone else ignored the character but Shawn. The young man typed, "What's the matter?" The woman responded that she was an asthmatic college student in Finland who had stayed late in the computer lab, gotten locked in and was having trouble breathing. She said she was getting worse by the minute and gave details including her name and address.

"It was too real to be a joke," Sean told the *Dallas Morning News*. He summoned his mother who called police. Sheriff's dispatchers enlisted a telephone operator who made the connection to Finland. Finnish operators then contacted local police. Eventually, an ambulance crew was sent to the school.

Meanwhile, the Finnish student was saying that it was getting worse. The last message was that she could hear the paramedics in the hallway. That's how it ended, until recently, when a fax arrived at the local police station from Interpol.

"Miss Laitinen, a 20 year old business student, got the medical attention she badly needed and is now doing well."

Sean's glad everything worked out for the best. "To be honest, I'm kind of embarrassed. Not that I helped her but that all of this [publicity] happened." Remember when stories like that were common, but the mode was ham radio and not the internet?

Ham O' The Year

Leo Meyerson, WOGFQ, of Omaha, Nebraska, was scheduled as the Dayton HamVention "Amateur of the Year." A ham for 69 years, WOGFQ founded World Radio Labs and was a manufacturer of "countless transmitters and receivers, including the Globe Scout and the Globe King."

At 86, Meyerson, who still plays tennis on weekends, made the trip to Dayton to accept his award.

Beacon Dud

Four climbers were stranded at the 9,500 foot level of Mt. Hood. With a blizzard closing in around them, a woman and three companions took refuge in a snow cave, then activated their emergency locator beacon. Forty hours later, no rescue team arrived — although all four survived.

Officials say that they were monitoring the emergency unit's frequency. But when the emergency locator beacon was tested, it was found to be audible for a distance of only 20 feet. Scott Russell, president of the Mountain Signal Memorial Fund says that every conceivable safeguard he been built into the cigarette-pack sized units. The locators cost about $400 each and are built to withstand 30,000 G-force. (Russell says that two bighorn sheep butting heads only generate 20,000 G-force.)

Additionally, the units are so waterproof that to change a battery, the manufacturer has to use a bandsaw to open the case. "We're going to do a complete investigation to get to the bottom of it," said Russell. "Somehow, something didn't come out right."

Congressional Freebie

"Go ahead, Congressman, pick a card, any card..."

Broadcasters' political contributions — more than $9.5 million over the last decade — and their power to shape the news, help them influence policy-makers, according to a group that monitors campaign fund raising.

Common Cause asserted that the big contributions — political action committee contributions — to congressional candidates and soft money to the republican and democratic parties from ABC, CBS, NBC, Fox, and their corporate parents and the National Association of Broadcasters, made it easier for the laws to be changed in the broadcasters' favor.

Recent legislative changes have made it possible for companies to own more TV and radio stations. Congress also decided to give broadcasters new digital TV licenses worth an estimated $70 billion dollars at a time when other frequencies are auctioned off for millions of dollars.

The report says that broadcasters are particularly effective lobbyists because they have the "power to report and shape the news" and "control how, and if, members of congress appear on television."

Scanner Listener Saves a Life

A cross-country phone call heard on a scanner apparently put an end to a murder-for-hire plot. Two men, one from the Seattle area and the other in Maryland, were on the phone working out details on how Todd Rogers could "take care of or kill" Aaron Lee Lord's friend, Andre Anthony. Lord promised Rogers $20,000 for making the hit.

A neighbor of Rogers overheard the whole conversation — accidentally, no doubt — on his scanner and alerted police. Using the information provided by the scanner listener, police followed Rogers to the airport where he met Lord and Anthony and arrested the two plotters. Rogers told detectives that he had lived with Anthony for 12 years and wanted him killed because he had stolen $50,000 from him that he had stolen from an ATM machine.

When detectives played the tapes for Lord, he said, "If that's what you guys say I did, then I guess I'm guilty."

Cordless Phone Saves a Life

After all of the anti-scanning propaganda coming out of Congress recently, it's not surprising that a lot of radio hobbyists have a bad taste in their mouths about cordless and cellular phones. That's not to say that the radio-phones are useless. Her's an example.

In Norton Shore, Michigan, Cecilia Wolcott got trapped inside her tanning bed. The bed was "lit up and it was getting plenty warm," said Cecilia. A switch malfunctioned, preventing her from raising the lid.

Thinking that she might "burn to a crisp if she didn't get some help," she realized that she had brought her cordless phone into the tanning bed with her. She dialed 911 and before long, police and firefighters arrived. The bed had to be cut apart to free Wolcott.

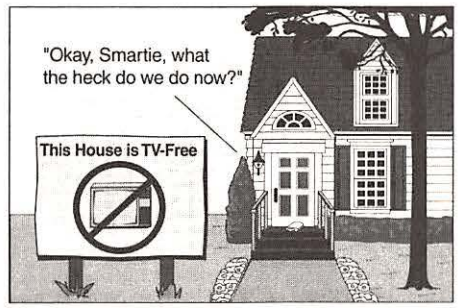
Italian TV

The glamorous Italian TV host was stunned. When Mara Venier asked the name of pop singer Franco Califano's latest album, the excited caller responded with Juliet Menyel. That answer was correct, not for the question that Venier asked but for *the question originally scheduled but canceled at the last minute:* what is the name of actor Alessando Gassman's mother?

"How is it possible you answered the question we were going to ask?" Venier cried into the telephone on live television. "Who told you?" But the line went dead. Still the flamboyant Venier kept raging into the receiver. "You can't jerk people around," he yelled. "There's 10 million lire in play. I'm calling the police."

No one seems to know what is going on. Italy is in the midst of an ongoing TV game show controversy. Venier is himself already under indictment for allegedly extorting money from sponsors.

Turned Off



TV-Turnoff Week is growing. Slowly, but it is growing. According to Henry Labalme, executive director of TV-Free America, 3 million people claimed to have met the challenge of a TV-free week in 1996. Figures for 1997 are not yet in.

Not everyone is so enthusiastic about turning off the tube. "I couldn't live without TV for a week," says Lynda Holland, a principal for New Haven Connecticut Community Schools. "[I] could never tell the kids to do it."

The networks are not taking TV Turnoff Week sitting down. Scheduled for the same week were programs where Ellen DeGeneres pronounces herself gay, Tori Spelling's character Donna Martin loses her virginity, and the Dukes of Hazzard are brought back for a special reunion show.

Believe it or not, it is estimated conservatively that the average adult spends four hours a day in front of a TV set.

Jacobs Honored

George Jacobs, an engineer for the Voice of America and Radio Free Europe, has been honored by the National Association of Broadcasters. Only one radio engineer is recognized each year for notable contributions in the field.

Jacobs was instrumental in the development and launch of the worldwide technical broadcasting system for the Voice of America and the modernization of Radio Free Europe and Radio Free Liberty. Jacobs also established several FCC-licensed shortwave stations in the US and converted ex-Soviet jamming stations to commercial broadcasting facilities.

"I hope that this isn't an award for me personally," Jacobs said. "It should be an award recognizing the value of shortwave broadcasting."

George has also been a loyal supporter of the hobby press, providing information for this writer while at *The Shortwave Guide* and *Monitoring Times*. Thanks George. The award *was* for you, personally.

Credits

"Communications" is edited by Larry Miller, who in turn thanks editors Rachel Baughn and Larry Van Horn. Thanks also go to John Bailey in the art department.

All of us owe our greatest thanks to the following members of the "Communications" monitoring team who look for, clip out, and mail in items of interest about radio: Richard Johnson, White Deer, PA; Mr. and Mrs. Kevin John Klein, Kimberly, WI; Maryanne Kehoe, Atlanta, GA; Bill McConnell, Clover, SC; Brian Oakley, Fort Worth, TX; Harry Shute, Edmonton, AB; Richard Sklar, Seattle, WA; Larry Van Horn, Brasstown, NC, and Phil Yasson. There is a possibility that I lost the names of a few contributors due to a computer glitch; please accept my apologies. Thanks also to *National Scanning, Radio World, Satellite Times, W5YI Report.*

Phantom in the Desert ...

A Radio Guide to Area 51

SR-71 Blackbird aircraft (Photo by Larry Van Horn)

YF-23 aircraft (U.S. Air Force photo)

By Larry Van Horn, Assistant Editor *Monitoring Times*

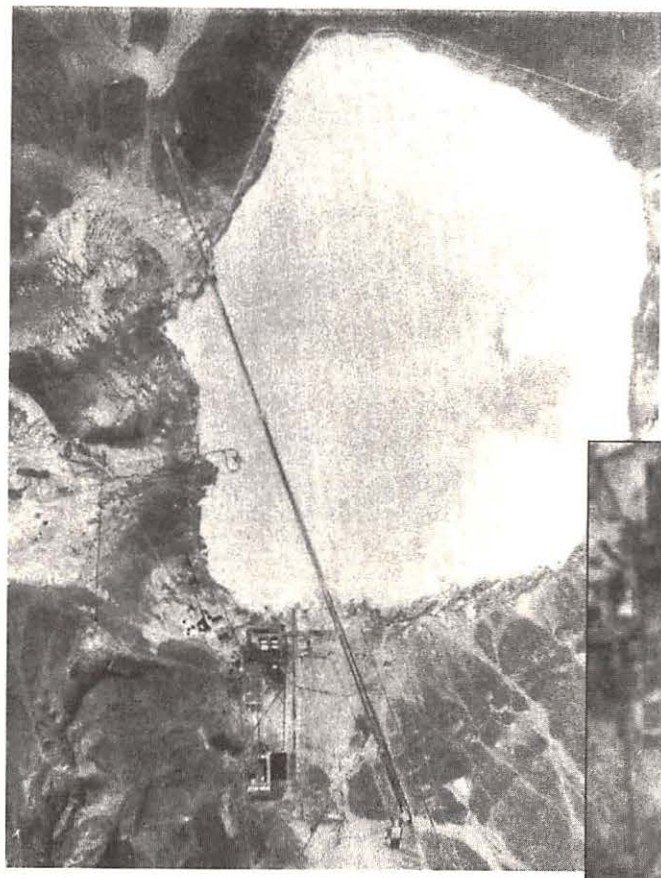
The deserts have always held a certain primal appeal for many people. But there is one American desert that holds a special high-tech fascination for many aviation and radio buffs. Maybe it is the strange lights that appear to dance in the night skies over the desert floor or rumors of captured flying saucers. Maybe it is the strange looking aircraft that cannot be seen on radar, or the rumbling from aircraft engines that cause earthquake sensors to trigger false seismic alarms. Or, maybe it is just the Cold War secrecy that draws our attention to this place.

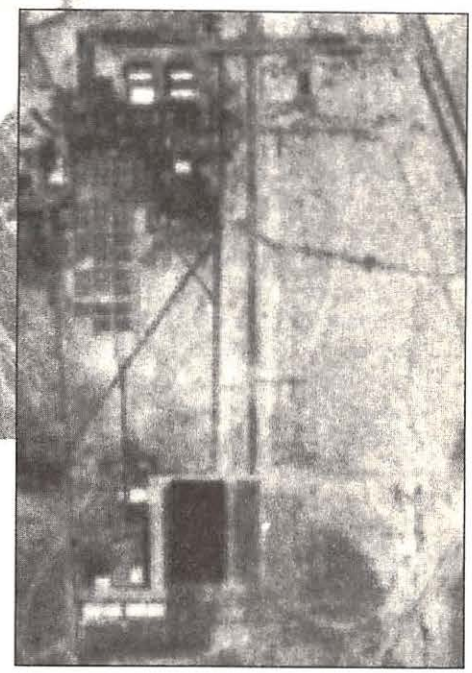
But the Cold War is over — at least this is what the American public has been told by our government and the media. And (if you believe a recent story in *Popular Mechanics*), we could be seeing the end of an air force base that is so secret, it doesn't exist. It is perhaps the most secret military installation in American history.

This base is nestled between steep mountains in the Nevada high desert. It is located inside the recesses of the off-limits Department of Energy (DOE) Nevada Test Site, 90 miles due north of Las Vegas. This phantom air force base consists of an airfield (among the largest in the United States), dozens of aircraft hangars, miscellaneous support buildings, several satellite dish gardens, a control tower, and a handful of U.S. Air Force 737 aircraft that fly in and out of its airspace daily.

Because its mission is so secret, its existence is not reflected in any federal government budget allocations. It doesn't appear on any U.S. Geological Survey maps. Check a Las Vegas sectional aeronautical chart and you won't find this airfield on it. In fact, the base doesn't even have an official name.

But the base that doesn't officially exist is there, and radio hobbyists know this phantom in the Nevada desert as Groom Lake or Area 51 of *Independence Day* fame.





U.S. Geologic Survey photo of Groom Lake in 1968. The base that doesn't exist. (Courtesy of the Federation of American Scientists). Below is a close-up of the bottom center portion of the photo.

A Step Back in History

In April 1955, Lockheed test pilot, Tony LeVier, was sent by his boss, Kelly Johnson, head of the Lockheed "Skunk Works" (the unofficial name for Lockheed's special projects division), to search for a remote site to test the new U-2 reconnaissance spy plane. He found a deserted spot in the central Nevada desert right next door to the Nevada Nuclear Test Site.

"I gave it a ten plus. Just dandy. A dry lake bed about three and a half miles around. I had some sixteen-pound cast-iron shotput balls with me and dropped them out to see if the surface was deep sand. Damned if it wasn't as hard as a tabletop," said LeVier.

U2R Spy Reconnaisance aircraft (Lockheed Skunk Works)

Several days later, LeVier flew Johnson and CIA special assistant Richard Bissell, to the site. Bissell remarked, "This will do nicely." He even liked LeVier's proposed name for the site, "Paradise Ranch."

Johnson decided to place a runway at the south end of the dry lakebed known to the locals as Groom Lake. Work then began on this covert facility under the direction of Kelly and the Lockheed Skunk Works.

Fronting for the CIA under a phony C&J Engineering logo, Kelly hired a construction company to put in water wells, two hangars, an airstrip, and a mess hall in the middle of the desert in blistering 130-degree summer heat.

In his book, *Skunk Works*, Rich Ben writes:

> "At one point, the guy Kelly used as his contractor put out a subcontracting bid. One subcontractor warned him: 'Look out for this C&J outfit. We looked them up in Dun & Bradstreet, and they don't even have a credit rating.' This base was built for only $800,000. 'I'll bet this is one of the best deals the government will ever get,' Kelly remarked to several of us. And he was right."

On August 4, 1955, the first flight of a U-2 spy reconnaissance plane was made at Groom Lake. Of course, the rest is history. But the U-2 wasn't the last secret aircraft to spread its wings on the dry lake bed of Area 51. In the 42 years since that first flight Groom Lake has been the first home of many top secret aircraft first and it is still in use today.

The Big Picture

Groom Lake is only a portion of one of the hottest areas in the world for military aircraft monitoring—the sprawling three million acre Nellis Air Force Range.

Located in North Las Vegas, Nevada, the primary mission of Nellis Air Force Base is the training of military aircrews in realistic air combat exercises. The vast, Connecticut-sized Nellis Range Complex, north and west of Las Vegas, is attached to the base. These ranges contain at least two secret bases, the aforementioned Area 51 and the Tonopah Test Range, both used for testing of advanced technologies. The DOE Nevada Test Site (frequencies in Table 1 and 2) — home to the U.S. government's nuclear weapons testing — is also a large part of the Nellis Range Complex.

For the military monitor, this is Mecca. Nowhere else in the world will one find a

TABLE 1: Department of Energy—Nevada HF Networks

Legend:
EACT Emergency Action Coordination Team
ERS Emergency Radio System
ERC Emergency Radio Centers
(All frequencies are in kilohertz and mode is USB)

Net Desig.	*Usage*	*Frequencies (kHz)*
NV301	Numerous Ionospheric Sounders	Various Frequencies
NV302	ERC/EACT/EACT Aircraft	2286.0, 6981.0, 7839.0, 9114.0,
NV306	Aircraft Operational Control Net	2621.0, 3422.0, 6535.0, 8912.0, 10045.0, 13312.0, 17901.0, 21931.0,
NV310	Emergency Radio System (ERS)	2625.5, 3335.0, 4480.5, 4603.0, 4946.5, 5378.0, 6930.5, 7428.0, 7464.0, 7690.5, 8054.5, 10554.0, 10870.0, 11125.0, 11556.5, 12020.5, 13802.0, 14400.5, 15454.5, 16065.0, 18416.0, 20404.0, 23532.0, 25431.0
NV315	Pacific Area Emergency Net	4479.0, 8053.0, 9114.0, 11125.0, 13802.0, 16065.0, 18416.0, 20404.0, 25431.0
SN048	Aircraft Air to Ground	4600.0, 4919.0, 8964.0,
SN297	Emergency Evacuation Comm Net	8053.0

DOE HF Callsigns

KAL 23	Oak Ridge Y-12 Plant, TN	KAL 24	DOE Headquarters Washington, DC
KBW 49	Nevada Test Site, NV	KGO 45	Estes Park (Rocky Flats Plant), CO
KLJ 87	Los Alamos National Laboratory, NM	KOI 20	Hickam AFB, HI
KOI 22	Tonopah Test Range, NV	KOI 23	Kauai Test Facility, HI
KOI 24	Johnson Atoll	KSJ 87	Lemont (Argonne National Laboratory), IL
KYS 6	Nevada Test Site, NV		

larger collection of military aircraft, military activity, and military radio frequencies. In most places around the country, monitors claim that the 225-400 MHz is like a wasteland on their scanners, but not on the Nellis ranges. Hundreds of frequencies have been cataloged and many more await discovery. A large sampling of those frequencies can found in our exclusive list in Table 3.

What follows are the descriptions of a few of the more interesting facilities on the Nellis Range.

Tonopah Test Range

The Tonopah Test Range (TTR) is a 625 square mile area located at the very north end of the Nellis Complex, about 32 miles southeast of Tonopah, Nevada. First opened in 1957, it has been a major test facility for DOE funded weapons programs by Sandia Laboratories of New Mexico. This facility is heavily instrumented with camera and radar tracking devices that record data from non-explosive aspects of nuclear weapons testing such as artillery shell testing, bomb drops, cruise missiles, rocket tests, and parachute testing.

In 1984, TTR also became host to the first F-117 stealth fighter squadron, prior to its being moved to Holloman AFB in New Mexico.

There are three electronic combat ranges located on this north range that provide user-selectable, low-to-high electronic threat environments. These ranges are:

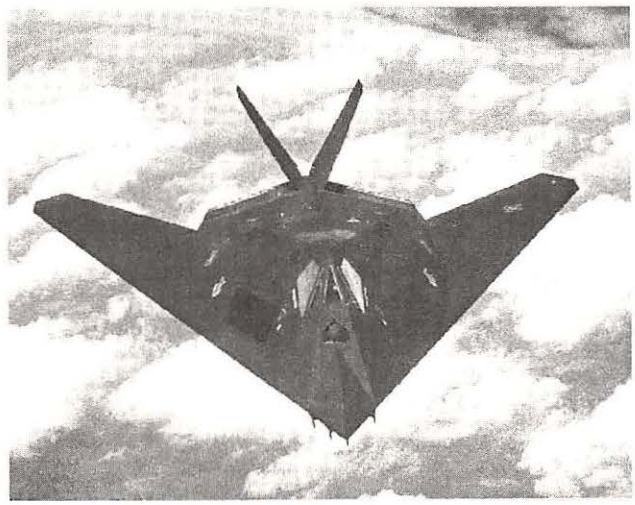
Tonopah Electronic Combat Range (TECR) — The TECR is the main, manned threat simulator range. It has generated mock electronic threats that include surface-to-air (SAM) missile sites with numerous anti-aircraft artillery (AAA) fire control radars to simulate a realistic array of enemy signals.

The following military air ("milair") frequencies have been reported from this range: 253.2, 253.6, 280.0, 284.0, 343.2 MHz.

Tolicha Peak Electronic Combat Range (TPECR) — The TPECR contains long- and short-range strategic threat and associated point defense systems, along with acquisition and ground control intercept (GCI) radars. The TPECR simulates enemy defense deep interdiction and offense counter air targets. Located on Pahute Mesa about three miles northeast of Tolicha Peak, it is a smaller range than the TECR and is less capable.

The following milair frequencies have been reported from this range: 235.2, 280.0, and 284.0 MHz.

EC South — This is a limited EC range that contains a few electronic threat simulators representing both missiles and AAA systems. The EC South range is not tied into the integrated air defense systems of the TECR/TPECR.



F-117A Nighthawk aircraft (U.S. Air Force photo)

Nellis Area II (Lake Mead Base)

Nellis Air Force Base Area II (once known as the Lake Mead base), is a separate facility about a mile northeast of the main Nellis base. Area II is a munitions storage facility for both conventional and non-conventional munitions (reportedly 200 nuclear weapons and air launched cruise missiles).

Area II is dominated by a high-security triple-fence compound encompassing several dozen earthen bunkers. This fence is well-lit at night and can easily by seen from Interstate 15 and passenger jets on approach to McCarran International Airport at Las Vegas.

In addition to the munitions storage, Area II contains the Nellis Federal Prison Camp, a minimum security prison occupying old air force dorms. The following frequencies are being used at this federal prison: 170.650, 170.875, 170.925, and 409.250 MHz, callsign KVL 331.

It is also the home for the 820th Red Horse Engineering squadron depot. Look for their communications on 149.175 and 149.500 MHz. HF equipped listeners might want to watch 11589.0 kHz (USB) for Red Horse activity.

Department of Energy

DOE is a large government player in the Las Vegas area. Over the years, several DOE civilian contractors have been associated with Area 51. One of the largest players, EG&G, was the prime contractor for the DOE/Nevada Test Site. EG&G also has played a large role in Area 51 operations.

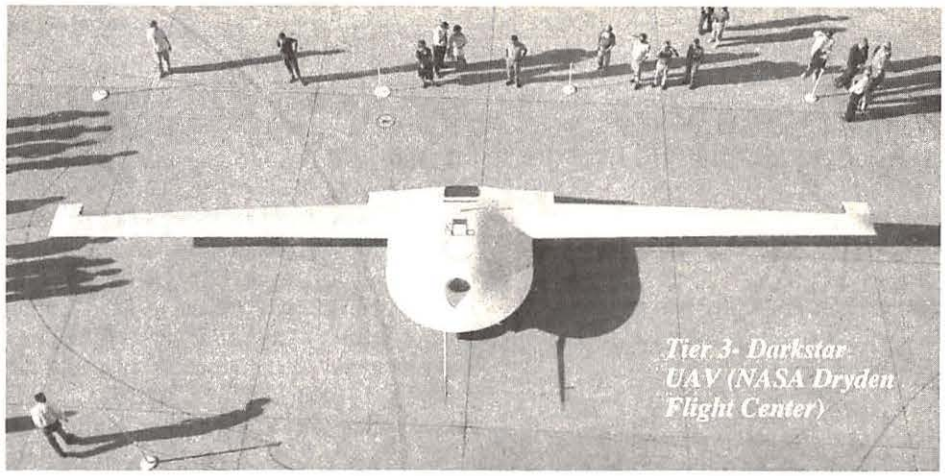
Additional companies associated with NTS operations included Radio Systems of Nevada (RSN) and Reynolds Electric Company (RECCO). According to an anonymous source these companies no longer have their contracts (except a special segment of EG&G). Those operations have now been taken over by Bechtel of Nevada. It is reported that EG&G is still involved in "special projects" (Area 51 almost by definition).

The status of the radio systems that EG&G used to support their operations on the NTS is unclear at this writing. We hope to have a clearer picture in the months ahead.

The most visible presence of the EG&G company continues to be at the McCarran International Airport. EG&G provides support at the Escondido facility for the daily Janet flights that ferry personnel to Area 51. Prior to the Air Force taking

control of the Boeing 737s that fly north to Groom Lake, a civilian company, Key Airlines, had the duty to transport groom Lake personnel. Look for Escondido facility radio activity on 164.250 (Security) and 164.750 (Maintenance support). Air to ground communications can be heard on 118.7 MHz (callsign Gold Coast)

Janet flights fly north from McCarran to Groom Lake and enter R-4808N (Groom Lake airspace); they contact Dreamland Control (Area 51 approach control) on civilian VHF aeronautical frequencies. Over the years, these



Tier 3- Darkstar UAV (NASA Dryden Flight Center)

TABLE 2: Department of Energy—Nevada VHF/UHF Networks

Legend:

DOD	Department of Defense	DOE	Department of Energy
EMS	Emergency Medical Service	NEST	Nuclear Emergency Search Teams
NTS	Nevada Test Site	(All frequencies are in MHz and mode is narrowband FM unless otherwise indicated)	

Net Desig.	*Usage*	*Frequencies (kHz)*
NV001	DOE/DOD Operations	173.6875/164.175
NV002	Local Law Enforcement Mutual Aid	154.770
NV003	NTS Fire/EMS/Radiation Safety Net	167.925/164.475
NV004	NTS Test Operations	170.750/164.375
NV005	Los Alamos Labs Operations	173.5125/164.100
NV006	EG&G Atlas Facility Technical Net	173.7125/164.775
NV007	DOE/Los Alamos Operations	407.050/416.300
NV008	NTS Sandia Operations	173.6125/164.275
NV009	NTS Los Alamos Operations	173.8125
NV011	DOE Nevada Command and Control	168.475/164.400
NV012	Public Safety Net	36.330/41.310
NV013	NTS Operations Net	170.025
NV014	Nevada DOE Common User Net (Dragon Ops)	167.875/164.025
NV015	NTS Operations	407.350/416.250
NV016	DOE Equipment Operations	408.950/415.150
NV017	NTS Field Operations	167.975
NV018	DOE Security/Emergency Net	167.825
NV021	NTS Operations	171.975/166.200
NV025	NTS Operations	168.350
NV026	Reynolds Electric Power Line Maint	36.050/41.030
NV028	NTS Operations	419.350
NV029	NTS Operations	406.425
NV030	NTS Security Net	166.225
NV032	NTS Operations	419.175
NV034	DOE Pager System	164.9625, 173.025, 410.800
NV037	NTS Operations	408.175/416.200
NV040	Reynolds Electric simplex field ops	162.475
NV041	NTS Operations	410.050
NV042	NTS Operations	411.150
NV044	DOE/NTS Control Link	406.625/414.775
NV047	EG&G Technical Ops (currently inactive)	148.350/150.450
NV049	EG&G Communications Net	170.350, 171.2375
NV050	EG&G Security - Escondido Facility	164.250
NV051	EG&G Maintenance - Escondido Facility	164.750
NV053	EG&G Technical Ops (currently inactive)	148.470/150.555
NV054	NTS Emergency Command Post	163.325
NV055	NTS Operations Net	169.575
NV057	NTS Security Force	414.725/409.200, 409.500
NV067	NTS Security Net	170.375/165.3125
NV069	DOE Managers Net	409.550/416.100
NV073	EG&G Technical Operations Net	409.325/419.150, 409.125
NV074	Wackenhut Security	410.000/419.650
NV076	DOE Radiation Safety Net	409.175/416.000
NV078	DOE/DOD Operations Net	409.775/417.600
NV079	EG&G Technical Operations	409.400/417.700
NV080	DOE Security Net	409.300/416.100
NV095	NTS Operations Net	172.725
NV095A	NTS Operations Net	173.175
NV100	DOE Las Vegas/NTS Trunking System	406.550415.350, 406.750/414.750, 407.550/416.750, 407.950/417.150, 408.750/417.550
NV101	Pahute Mesa Area Operations Net	171.000/173.6625
NV206	DOE NEST Teams	164.275, 167.850, 168.450, 171.200, 171.950, 173.000
NV307	DOE Meteor Burst Network	40.470
NV400	Air to Ground Comms at McCarren Intl (AM)	118.700
NV401	Desert Rock Airstrip Control Tower (AM)	118.700
NV402	Desert Rock Airstrip Approach Control (AM)	122.800
NV410	Desert Rock Airstrip/NTS (AM)	121.500, 122.750, 126.150, 255.800, 261.100, 315.100
EG&G Company (Las Vegas):		153.050, 464.500, 464.550, 469.500, 469.550
DOE NTS Medical/EMS frequencies:		462.950, 462.975, 463.000, 463.025, 463.075, 463.100, 463.125, 463.150, 463.175

frequencies have changed (sometimes yearly). When the aircraft come within five miles of Groom Lake, control is handed off to the Groom Lake tower (again on a VHF civilian frequency).

Janet flights also fly up to the Tonopah range and it is reported that some flights originate from Edwards AFB (home of AFFTC-Air Force Flight Test Center).

Area 51

The Air Force Flight Test Center (AFFTC) is headquartered at Edwards AFB, California. There is ample evidence to indicate that AFFTC operates the secret base at Groom Lake. This assumption is drawn because AFFTC appears on many documents regarding base security and land use. AFFTC is also the logical master, because Area 51 was founded for the testing of secret aircraft and Edwards is responsible for that function. Also, Det 3, AFFTC, is the organization responsible for security at Groom Lake.

In addition to AFFTC military personnel, Groom Lake is home to numerous civilian aerospace personnel that are there to support the testing program. An eyewitness of Groom Lake operations has revealed who occupies the various sections or sites on the base. Here is that exclusive list:

S-2	Northrup/Grumman	B-2 bomber, Tacit Blue, A-12 follow-on
S-3	Unknown	No air vehicles spotted
S-4	Lockheed	A-11, U-2, SR-71, F-117 (Have Blue), Darkstar (Tier 3- UAV)
S-6	Unknown	Several variants of C-135 aircraft sitting around
S-7	----------	Seems to be in a caretaker status
S-9	Teledyne Ryan Aero	Tier 2+ and Tier 3+ UAVs

Since these are civilian companies, scanner enthusiasts might want to check VHF/UHF itinerant frequencies for activity from the base. Be sure the following frequencies are loaded into your scanner: 151.505, 151.625, 154.570, 154.600, 158.400, 451.800, 456.800,

464.500, 464.550, 469.500, 469.550 MHz. You should also have the U.S government itinerants (27.575, 27.585, 163.100, 168.350, 408.400, 418.050, 418.075, 418.575) and aircraft emergency (121.500/243.0) frequencies loaded.

And Then There are the Rumors

One rumor about Groom Lake that many citizens take seriously is that area S-4 is where the remains of the Roswell flying saucer were taken and where the US government is reverse engineering a flying saucer. This is all supposed to be in an area located south of the base at a secret mountain facility near Papoose Lake.

There has never been any credible evidence to support this conclusion and, based on the information above, the author seriously doubts any of these claims. This is a Deep Black base that supports advanced technology aircraft, but that is all.

Taking a trip to Dreamland?

Area 51 is a closed government facility; anyone wanting to take a trip to Groom Lake should be aware that no one is allowed on or near this closed facility. There are signs posted indicating that deadly force is authorized (and they mean serious business). The security force you will run into are known as the "cammo dudes" (so named by Glenn Campbell at the Area 51 Research Center). This security patrol is part of the AFFTC, DET 3 SP unit, and they don't mess around. You will find them on 141.550 and 142.500 MHz.

According to a copyrighted story in the June 1997 issue of *Popular Mechanics* magazine, the cammo dudes are gone and with them the beginning of the end of Area 51. According to the story written by Jim Wilson, Science/Technology editor, Area 51 is shutting down and moving to the Dugway Proving Grounds in Utah. However, as of this writing, Janet flights continue into Groom Lake and we do not see any let-up in activity. The *PM* story is highly suspect in its content and conclusions.

If you are planning a trip to the Groom Lake vicinity, I highly recommend you purchase a copy of Glenn Campbell's *Area 51 Viewers Guide*. This is the best and most informative work on the Groom Lake/Nellis area and a requirement for those wanting to make the pilgrimage. You can find more information about the *Viewer's Guide* and Groom Lake on the Internet by visiting Campbell's Internet site (the best on the Web) at: **http://www.ufomind.com** or write Glenn Campbell, P.O. Box 448, Rachel, Nevada 89001.

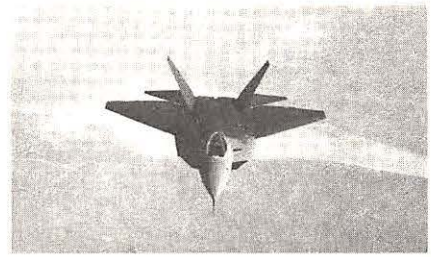
An article of this magnitude could not have been written without the help of numerous individuals and hundreds of hours of monitoring and research. I would like to specifically thank four individuals who really helped behind the scenes: Captain Xenon, my friend in the south, Glenn Campbell, and Bruce Ames. I dedicate this article to the person who got me started on this project several years ago: mygood friend, Ed Flynn.

There are many rumors, speculations, and wild theories about Groom Lake that have circulated over the years (we can now add the base closing to the list of oddities). But there is one rumor you can put to rest for certain: Groom Lake does exist and it isn't just a "Phantom in the Desert."

TABLE 3: Nellis AFB Complex/Range Frequencies

All frequencies are in MHz unless otherwise noted. Frequencies with numbers in brackets are aircraft radio preset channel numbers.

Nellis Airfield/Range Operations (AM mode)	
A-10 Ground Attack Coordination:	32.45, 32.65, 34.15, 40.15, 41.45, 41.95, 142.300
ACC Command Post:	Raymond 22 320.000, 381.100, 381.300
ACC Command Post (Nationwide):	311.0
ACMI Pod Shop:	288.600
Aerial Refueling Operations:	255.750, 291.900 (AR-625L), 295.400 (AR-641), 303.0, 305.500, 319.500 (secondary all routes), 344.700
ALCE (AMC) Command Post:	257.350, 259.950
Approach Control:	124.950/279.7 [6], 323.900
Automatic Terminal Information Service (ATIS):	270.100
Caliente MOA Range Control:	Jeddi GCI 289.300 [13], 286.500
Clearance Delivery:	120.900/289.400 [2]
Contingency:	305.450, 343.200
Control Tower:	132.550/324.300 [4]
Coyote Range Control:	379.400, 379.500
Dreamland MOA Control (R-4808):	118.55, 119.550, 120.050, 120.350 122.800, 126.150/255.800, 261.100
Departure Control:	135.100/352.800 [5]
Edwards AFB Test Range:	389.025
Elgin North/South (Boneyard Control):	357.100 [16]
Ground Control:	121.800/275.800 [3]
Helicopter Control:	134.850
Inbound Air Emergency/ Single Frequency Approach (SFA):	Alpha 321.100 [10], Bravo 385.500, Charlie 326.200, Delta 392.200
Interplane Communications:	225.350
Las Vegas Terminal Control Area:	133.950/295.0
Lockheed Test Frequencies (Nationwide):	275.200, 314.600, 345.400, 382.600
Los Angeles ARTCC:	377.100 [17], 352.050 [18]
Metro:	344.600
Nellis Range Control:	119.350/343.000 [7], 124.450/392.1, 126.650/253.400 [8], Bat Ops 297.500, 124.450/392.100, 238.150, 238.700, 268.600, 271.600, 272.100, 272.200, 274.800, 276.400, 278.400, 283.000, 287.500, 287.600, 289.200, 295.200, 304.800, 323.700, 343.300, 348.900, 349.500, 359.900, 389.000, 392.900
Pilot to Dispatcher (PTD):	372.200
Precision Approach Radar (PAR):	384.900, 397.200
Range 14 Operations:	357.500
Range 61 Operations:	320.100
Range 62 Operations:	280.000, 292.200
Range 63 Operations:	268.000, 361.600
Range 64 Operations:	260.100, 319.700, 351.200
Range 65 Operations:	288.800
Range 71 Operations:	344.800
Range 74 Operations:	228.000
Range 75 Operations:	363.900
Range 76 Operations:	354.300
RBS EW Training (Utah Test Range):	283.700
Red Flag Exercise Operations:	GCI 225.450, ACMI 238.800, GCI 259.400, 266.600, Snake Ops (GCI) 268.200, 270.025, Barnyard (GCI) 294.900, 288.000, 290.800, 293.500, 343.200, 343.200, 397.000
Red Flag/Green Flag:	Frisbee Ops 228.200, 229.250, 233.450, 238.650, 253.700, 255.700, 260.250, 266.000, 276.050, 276.850, 291.850, 292.450, 308.000, 309.500, 316.200, 318.400, 320.800, 325.500, 326.400, 327.200, 338.400, 347.400, 349.200
Red Flag Squadron Common:	Red Flag Ops 234.900 [1]



YF-22 Raptor aircraft (U.S. Air Force photo)

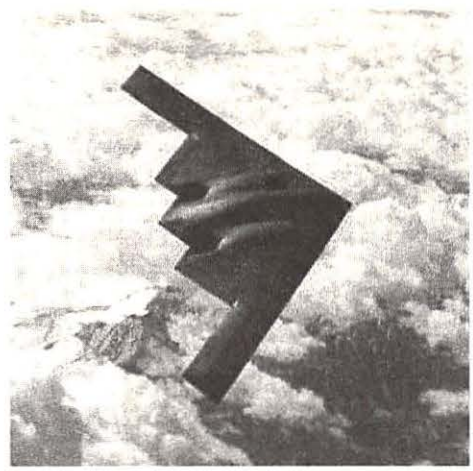
Red Flag Tonopah Range (Wildfire 3):	46.65, 46.75, 46.85
Search and Rescue Training (SAR):	252.800, 259.000, 392.775
Squadron Common:	225.500, 257.100, 264.600, 305.650, 315.800
Supervisor of Flying (SOF) 414 CTS-MIG Ops:	139.925, 139.975,
Supervisor of Flying (SOF) 57 FW-Bullseye Control:	303.200 [9], 304.900
TACCS Training:	319.300
USAF Thunderbirds Flight Demonstration Teams:	141.850, 322.950
VHF Air to Air:	138.025, 138.100, 138.200, 138.250, 138.275, 138.375, 138.425, 138.750, 138.875, 139.050, 139.100, 139.500, 139.700, 139.725, 139.750, 139.800, 139.850, 139.875, 139.900, 140.375, 140.400, 140.425, 141.000, 141.150, 141.550, 141.625, 141.675, 141.900, 142.175, 142.525, 143.750, 143.825, 143.925, 148.450, 149.525
VHF Search and Rescue (SAR):	138.300
414 CTS Command Post (MIG Ops):	252.100
Other known active freqs:	127.650, 228.500, 228.750, 233.400, 236.500, 238.300, 240.150, 251.200, 252.200, 253.600, 258.250, 275.850, 308.600, 314.300, 325.900, 333.550, 334.100, 335.800, 335.900, 337.400, 337.500, Rambo 341.500, 349.700, 360.000, Cobra Ops 361.500, 364.000, 364.050, 375.800, 379.550, 385.800, 390.000

***Nellis Ground Frequencies* (Narrowband FM mode)**

ACMI Maintenance:	148.400/150.350, 148.450/150.325
Airlift Control:	413.300, 413.350
Base Paging:	150.200/138.325
Base Police:	F1 163.4875, F2 163.5875
Base Taxi/Transportation Dispatch:	150.300
Civil Engineers:	173.4125/163.4625, 163.5125/165.0875
Combat Arms School:	413.050
Commanders Net:	148.325/149.000, Ops-1 173.150/165.0125, Ops-2 173.5375/165.1125
Contingency:	138.050, 163.5625
Disaster Contigency:	149.450
Explosive Ordinance Disposal (EOD) Teams:	149.750
Fire/Crash:	Tac-1 173.5875, Tac-2 173.8375
Flightline Operations:	138.225/140.300, 139.825, 140.675, 141.575, 148.075, 148.175, 148.450, 148.700, 149.200, 149.325, 149.550, 150.125, 164.050, 173.8625
Flightline Operations (Red Flag):	409.025, Fox 2 411.850, 413.275, 415.625
Groom Lake Ground Intrusion Sensors:	496.250, 496.275, 486.300
Groom Lake Security Patrols:	141.550 (Unconfirmed), 142.200
Groom Lake Video Surveillance Cameras:	210.010
Hazmat Contigency/Operations:	141.725
Law Enforcement (Security):	407.500
Maintenance:	163.5375/173.4625
Medical Net:	173.5625/168.000
Miscellaneous Test Range:	141.775/143.475
Munitions:	149.475 (Flightline), 165.1875, 413.400
Nellis Range Control:	Fox-1 150.225, Fox-2 148.100/150.275, Fox-3 148.225/149.150, Fox 4 148.500/150.175, 148.250/150.100, 409.025, 412.850, 413.375, 413.500, 413.550
POL Dispatch:	Net A 148.300, Net B 150.050
Ramp Control/Base Ops:	148.525
Range 62:	412.950
Range 71:	413.450
Red Flag Maintenance:	142.750
Red Flag/Green Flag Maintenance:	413.225
Red Horse CE:	149.175, 149.500
Security:	139.600, 141.925, 143.875, 162.6125, 163.5375, 166.5625, 170.175/173.7375, 170.500, 170.600, 173.6375
Security Nellis Area 2 (Weapons Storage):	164.500, 163.375/165.0625 "Pickup Control"
Special Communications:	142.175
Supply Depot:	142.125
Test Range Safety:	407.575
Unidentified communications:	138.300, 138.400, 138.900, 138.950, 148.050/149.225, 148.475, 149.250, 149.875, 407.550/413.125, 408.400/418.050, 418.075, 418.575
USAF MARS:	143.775/142.275, 143.450/142.150
USAF Thunderbirds:	Maintenance 413.025, 413.100

McCarran International Airfield Operations (AM mode)

ATIS:	Departure 125.600, Arrival 132.400
Clearance Delivery:	118.000/379.950
Control Tower:	119.900/257.8
Ground Control:	121.1, 121.9, 319.950
Janet Flights Air-Ground (Escondido facility):	Gold Coast 118.700
Las Vegas Approach:	120.450, 127.150, 379.150
Las Vegas Departure:	South 125.9/380.050, North 133.950/353.700
Las Vegas Class B Airspace:	353.700, 379.150, 380.050
Las Vegas Radio:	122.4 (Reno FSS)
Unicom:	122.950



B-2 Stealth bomber (U.S. Air Force photo)

***Desert Rock Airstrip (NTS)* (AM mode)**

Control Tower:	118.700 (shared with TTR/McCarran)

Indian Springs AAF

Control Tower:	118.300/358.300 [12] (AM)
Fire/Crash:	173.075/173.9875 (FM)
Flight Support:	165.0375 (FM)
Flightline Operations:	165.1375, 409.025, 415.625 (FM)
Ground Control:	118.300/275.800 (AM)
Ground Defense Forces:	138.350/148.550 (FM)
Helicopter Control:	122.900 (AM)
Pilot to Dispatcher (PTD):	372.200 (AM)
Range Control (R-4806):	138.150/141.700 (FM)
Security:	173.4375 (FM)
Supervisor of Flying (SOF):	142.250 (AM)
Unknown usage:	173.9375 (FM)

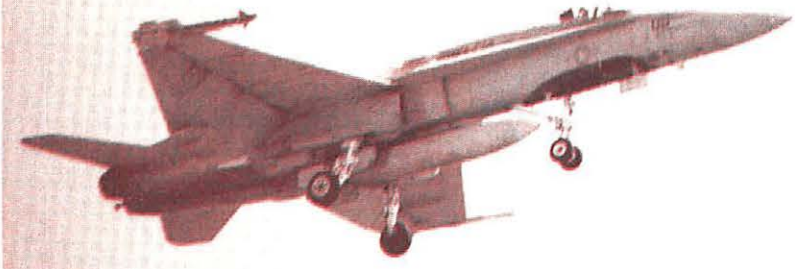
Tonopah Test Range

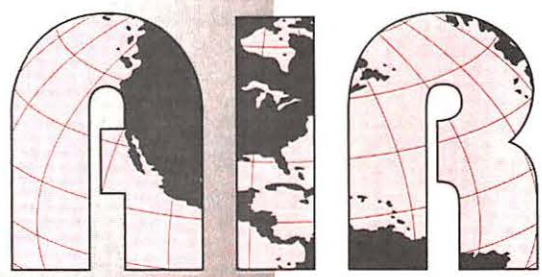
Approach Control:	124.750, 126.950/338.700 (AM)
Control Tower:	126.600, 127.250 (AM)
Fire Net:	409.975 (FM)
Flightline Operations:	F3 148.200/150.600, 149.425, 173.100/165.0625 (FM)
Range Control:	118.700, 377.800 [15], 239.900, 254.750, 255.950, 256.775, DOE 257.000, 262.000, 264.7, 264.750, 266.300, 286.700, 287.300, 297.750, 376.100, 383.300, DOE 384.000, DOE 384.800, 389.100, 399.800 (AM)
Test Range Operations:	407.300/412.900, 407.650/413.250, 407.975/413.575, 408.800/414.400 (FM)

Watertown Strip

Air to Ground Operations:	297.650 (AM)

A Change is in the...





Hornet traffic at NASD Miramar is increasing due to its upcoming change to a Marine Corps Air Station.

The Department of Defense's BRAC Recommendations are closing and relocating military bases all across the country, and changing the airwave terrain for military aviation monitors.

By Laura Quarantiello

In the world of government, it's always about money. Forget stars and bars, jets and tanks — what really matters to the people on the Hill are dollars and cents. In 1990, this simple fact of modern bureaucracy was made painfully clear to us all when the United States Department of Defense rubber-stamped a sweeping proposal for change affecting US military bases within the country. They called it the Defense Base Closure and Realignment Act (BRAC), but many Americans called it unthinkable. For the first time in memory, the US government was planning the ultimate downsizing move, a wholesale slash and burn job on military installations.

The reason is really very simple and so is the math: the Cold War is over and defense budgets are shrinking. Put two and two together and you come up with the easy answer: if we close, realign and consolidate some of our military bases, we satisfy the experts who say we don't need so much military might anymore, and the pencil-pushers who say we need to reduce the budget. To the government, that's a win-win situation.

The BRAC process began in 1991, following Presidential appointment and Senate approval of an eight member committee. The Committee heard the recommendations for closure and realignment transmitted to them from the Secretary of Defense and made final recommendations that were handed to the President. The final round of closure and realignment recommendations were signed, sealed, delivered, and finalized by Presidential approval in 1995.

One thing about military monitoring will never change; getting up close and personal is still discouraged. This sharp fence separates the runways from the public highway.

Dozens of bases have been approved for closure, some have already bolted their gates and transferred their personnel. Thousands of people, both military and civilian — not to mention states and entire cities — have been affected through loss of jobs and revenue. No state has been spared from the sharp government commission ax; there are losses from Alabama's Fort McClellan, to Texas' Bergstrom AFB, to Wisconsin's NRC Sheboygan. For the military monitor, especially military aviation fans, BRAC means change.

Unsettled Airwaves

As soon as the BRAC Commission began recommending specific installations for closure or realignment, scanner listeners nationwide started to get a bad case of the jitters. Which bases would close? What would happen to the squadrons based there? We aren't talking solely about small Reserve bases or remote outposts (though smaller installation are on the hit lists, too), we're talking about larger installations like California's Long Beach Naval Shipyard, March Air Force Base, and MCAS El Toro; Massachusetts' NAS South Weymouth; Michigan's Selfridge Army Garrison; and Mississippi's NAS Meridian. The impact is undeniable and far-reaching for listeners.

Since 1990, sixty major bases and 104 minor facilities across the country from all branches of the military have been closed. The 1995 round of recommendations have resulted in the listing of many more facilities for closure or realignment. Every facility closure has repercussions, resulting in the disestablishment or transfer of squadrons, detachments, units, and tenant commands. Many personnel and resources are realigned (the military's politically-correct word for shifting assets) to other installations.

The actual changes wrought by BRAC are being implemented on a two-to-six year scale, a relatively slow arc of relocations and outright closures. In some areas the moves are complete, while in others the changes are more gradual and the full impact has yet to be felt. Some bases are already ghost towns, others are or will be taking on new personnel, forcing an increase in activity. Some listeners have lost as a result of all this shuffling, but many have realized a gain.

Because so many of the BRAC closures are aimed at Air Force Bases and Naval Air Stations, military aviation listeners are experiencing more than their fair share of airwave fluctuations.

"In our rural neighborhood," says *MT* editor Rachel Baughn, "we've heard more military aircraft communications in the past four months than we have in the previous ten years." In Virginia, listeners are overjoyed at the growth in communications that have resulted from the transfer of all F-14 Tomcat squadrons from the West Coast. Many listeners are experiencing military air ("milair") communications on a large scale for the first time, surprised at the surge of voices on previously quiet frequencies.

In contrast, some states are bearing the negative side of all this downsizing. In California, the state hardest hit by the 1995 recommendations, prime listening targets like Castle, Norton, and George Air Force Bases are already long gone and the 1995 BRAC orders have slated other top targets like MCAS El Toro, NAS Alameda, and NAS Moffett Field for closure. Force shifts are already in progress and the results are apparent on the airwaves.

The military traffic in San Diego isn't all jets.

What does all this mean to the average military air listener? How do all the closures, realignments, losses, and gains affect actual radio communications?

Bogies and Bandits

As a long-time California milair fan, I've felt the effects of BRAC for several years, but not until the '95 recommendations came down from on high did I really sense a change in the air. My location in the San Diego County area of Southern California is a literal nirvana for a milair monitor. I have access to the communications of several large Navy and Marine Corps bases and their acres of restricted areas, as well as one of the largest military aviation playgrounds, Whiskey 291, a warning area which stretches from Santa Catalina Island down past Mexico.

Military air communications have never been strangers to my scanner and I've long enjoyed afternoons in front of the speaker, as well as day trips to NAS Miramar and MCAS Camp Pendleton for a little front-row action. The government's BRAC Committee has threatened to change all of that.

In 1993, the Committee selected Marine Corps Air Station El Toro for closure, with relocation of all aircraft along with their dedicated personnel, equipment, and support to other naval air stations. This move resulted in another edict in 1995: NAS Miramar would become a Marine Corps Air Station. All of Miramar's squadrons and related activities would be ejected, taking up residence at other naval air stations, primarily NAS Oceana, Virginia; NAS North Island, California; and NAS Fallon, Nevada. These pronouncements shook many area milair listeners.

Miramar was the Navy's west coast master jet air station, the home of Pacific Fleet F-14 squadrons, the Top Gun Fighter Weapons School, and Top Dome E-2C School. Traffic from the base was high speed and high frequency; any time of the day was a good time to monitor communications.

Motorists on I-15 pass right under the final approaches to Miramar's two runways and jet traffic was common and virtually non-stop. More than one driver has ducked at the sight of a massive $30 million dollar jet passing over their car roof, landing gear dangling.

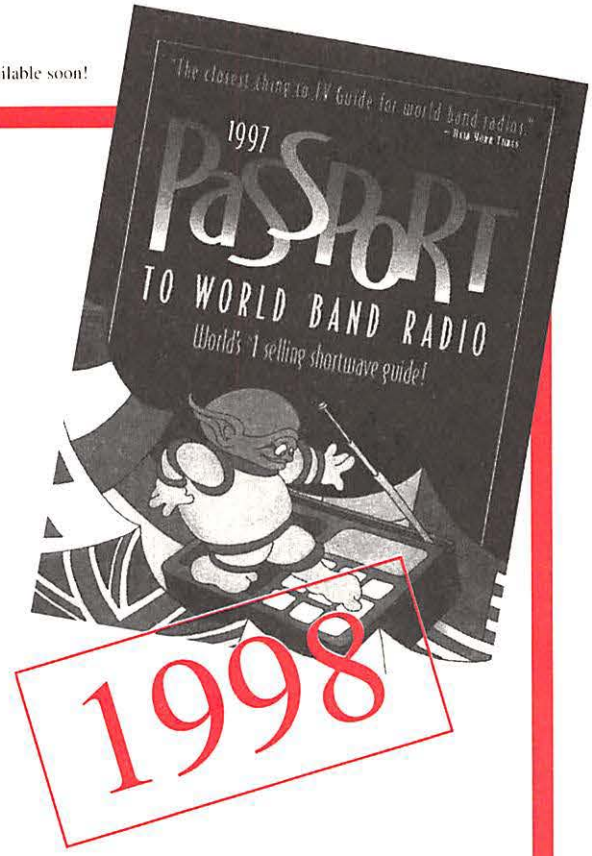
What would happen to all this when the Marines moved in? We worried about the changes for three years.

Then, in 1995, the commission's '91 recommendation to close MCAS Tustin and relocate its helicopter assets to the Marine Corps Air Ground Combat Center at Twentynine Palms, California, was changed: now MCAS Tustin helicopter assets would be distributed among other naval air stations throughout the country, primarily

Coast Guard 6501, an HH-65A Dolphin, returning from a rescue mission.

Note: 1997 cover shown. New cover art available soon!

Time to Update your *Passport*?



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MCAS New River, North Carolina; MCB Hawaii (MCAF Kaneohe Bay); MCAS Camp Pendleton, California; and NAS Miramar, California. A new day was dawning for Miramar monitors. Maybe listening wasn't doomed after all.

As the F-14 squadrons began to close up shop and fly off to their new bases, radio communications experienced a definite downturn. The airwaves were suddenly quieter, the "Beaver" Fleet Area Control and Surveillance Facility discrete frequencies were all but dead.

The familiar "Top Gun," "Gunfighter," "Bandit," and "Bullet" call signs of Miramar-based F-14 squadrons were gone. In the lull of the transition, military listening had taken a blow.

But, then, in 1996, things began to change. There were new call signs on the air, some that I had heard before, but infrequently; some new. The tactical discretes came alive with dogfighting again. Many of MCAS El Toro's F/A-18 Hornet squadrons arrived at Miramar, ready for permanent residence.

In August, the last F-14 squadron departed Miramar for NAS Oceana, Virginia. It was the end of an age, but the beginning of a new history.

Everthing Old Is New Again

NAS Miramar is officially scheduled to transition to Marine Corps Air Station Miramar on October 1, 1997. Several Marine Corps F/A-18 squadrons are already onboard NAS Miramar with the remainder of the El Toro F/A-18's and helicopter squadrons due to arrive prior to the scheduled closure of that base in 1999. The Marine Corps has aggressive plans to refurbish Miramar, including many millions of dollars to update facilities, build new base housing, refurbish hangars, and prepare MCAS Miramar for the technical demands and challenges of the new millennia.

In March, I made several trips to Miramar to get a feel for what had changed. What was happening here was happening at other bases across the country and I knew that other listeners were as unsettled as I was. There was a time when going to Miramar at any time of the year meant a mini-air show. I feared that because of the long, sweeping arm of BRAC, that would be different today.

Miramar lies approximately twenty nautical miles north of the city of San Diego and five miles east of the coast. The base has three runways, the two east-west runways — 24L and 24R — serving as the primaries. The approaches to runways 24L and 24R begin east of the base and pass over Interstate 15 and Kearny Villa Road. This latter road is a prime viewing spot for listeners and it isn't uncommon to find others parked with binoculars and radios. Both the north and southbound sides of the road sport "No Parking Any Time" signs that define the area immediately beneath the approach ends of the runways, but parking just short of or beyond the signs avoids the wrath of passing law enforcement.

My favorite time of day at Miramar is around 2 pm, when aircraft that have departed prior to noon for Warning Area sorties, return to the roost. By this time, any low scud and coastal clouds have burned off, providing a clear blue sky for viewing. Binoculars are a must for picking out the tiny fast-movers from the sky and a headset is recommended; both the jet and vehicle traffic noise make listening hard at times. A camera is another must-have, and by walking up beyond the No Parking signs you can obtain great photographs, even with relatively short lenses.

281.8 MHz is the primary approach fre-

quency for the base and handles most of the traffic returning from warning area Whiskey 291. Aircraft on Approach stay on this frequency until reaching "Atlas," the outer marker, where they are handed off to the Tower on 315.6.

Those jets making PAR (Precision Approach Radar) approaches take the switch from Tower to "Paddles," the PAR controller on 362.6. Plugging in these three frequencies will keep you happy and in the know while at Miramar (see sidebar for other base frequencies).

It only took one trip for me to discover that Miramar was far from dead. Smoke 19, an F/A-18 Hornet from VMFA-134, called Atlas for the overhead and came roaring in at over 200 knots, pulling into a hard left break to the downwind. He was followed by two squadron mates, Smoke 18 and 20, who flew a beautiful overhead break, peeling off from each other smoothly. Tower cleared 18 for runway 24L, and sent Smoke 20 to 24R. There's nothing like simultaneous approaches to get your blood pumping. All three aircraft requested touch and goes.

Meanwhile, Ghost 1, an E-2C Hawkeye, came up on Tower requesting a full stop, while Misty 30, an S-3, began talking to Approach Control. As if that wasn't enough, Raider 81, a KC-130 from El Toro, came up on Approach, asking for multiple approaches to Miramar. Before the day was over, I would be treated to an assembly line of aircraft: F/A-18's, F-14's, E-2's, S-3's, KC-130's, EA-6B's and even a flight of five Canadian Air Force CT-114 Tutors.

There is no denying that things have changed at Miramar and "Fightertown U.S.A." is hardly the place it was when Top Gun called it home base; however, the effects of BRAC have not been negative. Air traffic is once again increasing and, after a lull, the coastal Warning Area is once again the place to monitor for milair action.

Cut and Paste

No matter what area of the country you live in, the BRAC Committee pronouncements will have an effect as squadrons are cut from one area and "pasted" to another. Whether large or small, positive or negative, only some time in front of the dials will answer.

Pay special attention to air traffic control UHF frequencies for aircraft transiting to and from restricted areas and other special use airspace. This is often the first clue to new activity. Don't remove or lock out previously active tactical freqs; keep an eye on them for renewed communications. And don't forget to dedicate some time to searching the 225-400 MHz band for new frequencies.

In the world of government, it may always be about money, but in our world, it's about communications — a commodity that never truly runs out.

NOTES:

- In April 1997, tentative plans for another round of base closings were revealed.
- Laura Quarantiello is a long-time scanner listener and author of several books on scanning, including *Air-Waves: The Aviation Monitor's Handbook* (Tiare Publications, 1-800-420-0579). She can be reached by e-mail at LauraQ@juno.com.

TABLE 1

Marine Aircraft Group 11 MCAS Miramar, California			
VMFA-134	Smokes	F/A-18	"Smoke"
VMFA-212	Lancers	F/A-18C	"Lancer"
VMFA-232	Red Devils	F/A-18C	"Devil"
VMFA-235	Death Angels	F/A-18C	
VMFA-314	Black Knights	F/A-18C	"Knight"
VMFA-323	Death Rattlers	F/A-18C	
VMFA(AW)-121	Green Knights	F/A-18D	
VMFA(AW)-225	Vikings	F/A-18D	"Viking"
VMFA(AW)-242	Bats	F/A-18D	"Bat"
Marine Aircraft Group 11 (Rear) MCAS El Toro, California			
VMFAT-101	Sharpshooters (FRS)	F/A-18A/B/C/D	"Shooter"
VMFAT-101	T-34C		
VMGR-352	Raiders	KC-130F/R	"Raider"
Marine Aircraft Group 13 MCAS Yuma, Arizona			
VMA-211	Avengers	AV-8B	"Wake"
VMA-214	Black Sheep	AV-8B	"Black Sheep"
VMA-311	Tomcats	AV-8B	"Tomcat"
VMA-513	Flying Nightmares	AV-8B	"Nightmare"
Marine Aircraft Group 16 MCAS El Toro, MCAS Tustin, California			
HMH-361	Flying Tigers (Tustin)	CH-53E	
HMH-363	Red Lions (Tustin)	CH-53D	"Red Lion"
HMH-462	Heavy Haulers (Tustin)	CH-53E	
HMH-465	Warhorses (Tustin)	CH-53E	
HMH-466	Wolfpack (Tustin)	CH-53E	"Wolfpack"
HMM-161	The First (El Toro)	CH-46E	
HMM-163	Ridgerunners (El Toro)	CH-46E	
HMM-164	Flying Claymores (El Toro)	CH-46E	
HMM-165	White Knights (El Toro)	CH-46E	
HMM-166	Seaelks (El Toro)	CH-46E	
HMM-268	Red Dragons (Tustin)	CH-46E	"Red Dragon"
HMM-364	Purple Foxes (El Toro)	CH-46D	
Marine Aircraft Group 39 Camp Pendleton, California			
HMLA-169	Vipers	AH-1W & UH-1N	"Viper"
HMLA-267	Black Aces	AH-1W & UH-1N	"Ace"
HMLA-367	Scarface	AH-1W & UH-1N	"Scarface"
HMLA-369	Gunfighters	AH-1W & UH-1N	"Gunfighter"
HMT-303	Atlas	AH-1W & UH-1N	"Atlas"

TABLE 2: MCAS Miramar Frequencies

315.6	Tower
380.8	Ground
280.4	ATIS
266.8	App/Dep
300.4	App/Dep
281.8	App/Dep
310.8	GCA
362.6	"Paddles"

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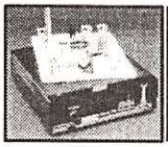

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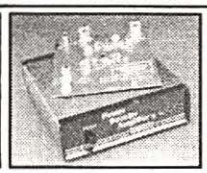

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LPA-1, Power Booster Amplifier Kit $39.95
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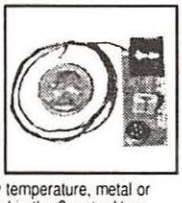
LPA-1WT, Fully Wired LPA-1 with Case $99.95

Micro FM Wireless Mike

World's smallest FM transmitter. Size of a sugar cube! Uses SMT (Surface Mount Technology) devices and mini electret condenser microphone, even the battery is included. We give you two complete sets of SMT parts to allow for any errors or mishaps-build it carefully and you've got extra SMT parts to build another! Audio quality and pick-up is unbelievable, transmission range up to 300 feet, tunable to anywhere in standard FM band 88 to108 MHz. 7/8"w x 3/8"h x 3/4"h.

FM-5 Micro FM Wireless Mike Kit $19.95

Crystal Controlled Wireless Mike

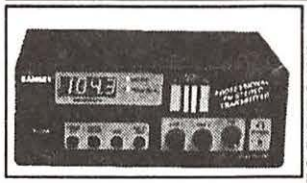


Super stable, drift free, not affected by temperature, metal or your body! Frequency is set by a crystal in the 2 meter Ham band of 146.535 MHz, easily picked up on any scanner radio or 2 meter rig. Changing the crystal to put frequency anywhere in the 140 to 160 MHz range-crystals cost only five or six dollars. Sensitive electret condensor mike picks up whispers anywhere in a room and transmit up to 1/4 mile. Powered by 3 volt Lithium or pair of watch batteries which are included. Uses the latest in SMT surface mount parts and we even include a few extras in case you sneeze and loose a part!

FM-6, Crystal Controlled FM Wireless Mike Kit $39.95
FM-6WT Fully Wired FM-6 ..... $69.95

Call for our Free Catalog !

Super Pro FM Stereo Radio Transmitter



A truly professional frequency synthesized FM Stereo transmitter station in one easy to use, handsome cabinet. Most radio stations require a whole equipment rack to hold all the features we've packed into the FM-100. Set frequency easily with the Up/Down freq buttons and the big LED digital display. Plus there's input low pass filtering that gives great sound no matter what the source (no more squeals or swishing sounds from cheap CD player inputs!) Peak limiters for maximum 'punch' in your audio - without over modulation, LED bargraph meters for easy setting of audio levels and a built-in mixer with mike and line level inputs. Churches, drive-ins, schools and colleges find the FM-100 to be the answer to their transmitting needs, you will too. No one offers all these features at this price! Kit includes sharp looking metal cabinet, whip antenna and 120 volt AC adapter. Also runs on 12 volts DC.

We also offer a high power export version of the FM-100 that's fully assembled with one watt of RF power, for miles of program coverage. The export version can only be shipped outside the USA, or within the US if accompanied by a signed statement that the unit will be exported.

FM-100, Professional FM Stereo Transmitter Kit $299.95
FM-100WT, Fully Wired High Power FM-100. ..... $429.95

Speech Descrambler Scrambler

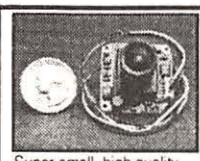
Decode all that gibberish! This is the popular descrambler / scrambler that you've read about in all the Scanner and Electronic magazines. The technology used is known as speech inversion which is compatible with most cordless phones and many police department systems, hook it up to scanner speaker terminals and you're in business. Easily configured for any use: mike, line level and speaker output/inputs are provided. Also communicate in total privacy over telephone or radio, full duplex operation - scramble and unscramble at the same time. Easy to build, all complex circuitry contained in new custom ASIC chip for clear, clean audio. Runs on 9 to 15VDC, RCA phono type jacks. Our matching case set adds a super nice professional look to your kit.

SS-70A, Speech Descrambler/Scrambler Kit $39.95
CSS, Custom Matching Case and Knob Set $14.95
SS-70AWT, Fully Wired SS-70A with Case $79.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

Tone-Grabber Touch Tone Decoder / Reader

Dialed phone numbers, repeater codes, control codes, anywhere touch-tones are used, your TG-1 will decode and store any number it hears. A simple hook-up to any radio speaker or phone line is all that is required, and since the TG-1 uses a central office quality decoder and microprocessor, it will decode digits at virtually any speed! A 256 digit non-volatile memory stores numbers for 100 years - even with the power turned off, and an 8 digit LED display allows you to scroll through anywhere in memory. To make it easy to pick out numbers and codes, a dash is inserted between any group or set of numbers that were decoded more than 2 seconds apart. The TG-1 runs from any 7 to 15 volt DC power source and is both voltage regulated and crystal controlled for the ultimate in stability. For stand-alone use add our matching case set for a clean, professionally finished project. We have a TG-1 connected up here at the Ramsey factory on the FM radio. It's fun to see the phone numbers that are dialed on the morning radio show! Although the TG-1 requires less than an evening to assemble (and is fun to build, too!), we offer the TG-1 fully wired and tested in matching case for a special price.

TG-1, Tone Grabber Kit $99.95
CTG, Matching Case Set for TG-1 Kit. $14.95
TG-1WT, Fully Wired Tone Grabber with Case $149.95
AC12-5, 12 Volt DC Wall Plug Adapter $9.95

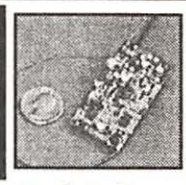


Mini-Peeper Micro Video Camera

Super small, high quality fully assembled B & W CCD TV camera the size of an ice cube! Provides excellent pictures in low light (2 lux), or use our IR-1 Infra-Red light source to invisibly illuminate an entire room on a pitch black night! Imagine the possibilities... build it into a smoke detector, wall clock, lamp, book, radio. Exact same camera that's in big buck detective catalogues and stores. Kit includes: fully assembled CCD camera module, connectors, interface PC board kit with proper voltage regulation and filtering, hook-up details, even a mini microphone for sensitive sound! Two models available: Wide Angle Lens 3.6mm/f2, adjustable focus lens, 92 degree view; Pinhole Lens 5.5mm/f4.5, 60 degree view. The Pinhole Lens is physically much flatter and provides even greater depth of focus. The camera itself is 1.2" square. The Wide Angle Lens is about 1" long, Pinhole Lens about 1/2", interface PC board is 1" x 2" and uses RCA jacks for easy hook-up to VCRs, TVs or cable runs. Power required is 9 to 14 VDC @ 150 mA. Resolution: 380 x 350 lines. Instruction manual contains ideas on mounting and disguising the Mini-Peeper along with info on adding one of our TV Transmitter kits (such as the MTV-7 unit below) for wireless transmission!

MP-1, Wide Angle Lens CCD TV Camera Outfit $169.95
MP-1PH, Pin-Hole Lens CCD TV Camera Outfit $189.95

MicroStation Synthesized UHF TV Transmitter



Now you can be in the same league as James Bond. This transmitter is so small that it can fit into a pack of cigarettes - even including a CCD TV camera and battery! Model airplane enthusiasts put the MTV-7A into airplanes for a dynamite view from the cockpit, and the MTV-7A is the transmitter of choice for balloon launches. Transmitter features synthesized, crystal controlled operation for drift-free transmission of both audio and video on your choice of frequencies. Standard UHF TV Channel 52 (which should only be used outside of the USA to avoid violating FCC rules), and 439.25 MHz or 911.25 MHz which are in the amateur ham bands. The 439.25 MHz unit has the nifty advantage of being able to be received on a regular 'cable-ready' TV set tuned to Cable channel 68, or use our ATV-74 converter and receive it on regular TV channel 3. The 911.25 MHz unit is suited for applications where reception on a regular TV is not desired, an ATV-79 must be used for operation. The MTV-7A's output power is almost 100 mW, so transmitting range is pretty much 'line-of-sight' which can mean many miles! The MTV-7A accepts standard black and white or color video and has its own, on-board, sensitive electret micorphone. The MTV-7A is available in kit form or fully wired and tested. Since the latest in SMT (Surface Mount Technology) is used to provide for the smallest possible size, the kit version is recommended for experienced builders only. Runs on 12 VDC @ 150 mA and includes a regulated power source for a CCD camera.

MTV-7A, UHF TV Channel 52 Transmitter Kit $159.95
MTV-7AWT, Fully Wired Channel 52 Transmitter $249.95
MTV-7A4, 439.25 MHz TV Transmitter Kit $159.95
MTV-7A4WT, Fully Wired 439.25 MHz Transmitter $249.95
MTV-7A9, 911.25 MHz TV Transmitter Kit $179.95
MTV-7A9WT, Fully Wired 911.25 MHz Transmitter $269.95
ATV-74, 439.25 MHz Converter Kit $159.95
ATV-74WT, Fully Wired 439.25 MHz Converter $249.95
ATV-79, 911.25 MHz Converter Kit $179.95
ATV-79WT, Fully Wired 911.25 MHz Converter $269.95

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Monitoring Private & Commercial Aviation

By Bill Maulden

As an old pilot once said, "Son, flying is a carefully balanced mixture of hours of boredom sparked with moments of sheer terror and excitement." You could also apply this statement to the hobby of monitoring commercial and private flying today.

Most aviation band listeners will quickly stand on their soap box and tell you that when there is some excitement on the aviation band, it can surpass most listening catches on the police and fire band by leaps and bounds. I'll have to agree. With over 30,000 hours in the cockpit myself, I can certainly say that I've listened to more than my share of aviation radio conversations. The following true story took place several years ago when we were passing over northern Utah, going to Seattle at 41,000 feet. We were being controlled by the Federal Aviation Administration's Salt Lake Center Air Route Traffic Control Center (ARTCC). This sector of the Salt Lake ARTCC was not only working the high altitude flights, but the low altitude ones as well.

As soon as we switched to the frequency, we were aware that something unusual was going on. The frequency was a beehive of activity. We quickly checked in and listened. Soon, we were aware that the controller in the Salt Lake Center was working a student pilot or a very low time private pilot and there was trouble on the frequency. The pilot was doing a cross country solo flight from Butte to Bozman. Flight conditions were not all that great. From our observation at 41,000, it appeared that there was considerable lower cloud cover with light snow obscuring mountains, ridges, and probably most airports within our visual viewing distance. Not a good day for the inexperienced to be out flying, to say the least.

As the cockpit radio continued to share the plight of the inexperienced pilot, we learned that she was at an altitude just above the overcast. The pilot was not totally lost, but she certainly had no idea of where she was — a dangerous condition when visibility is low,

fuel is a concern, and the instruments are not working as expected.

We quickly brought up the Bozman airport weather on the ACARS (aircraft communications addressing and reporting system) screen. The latest observation indicated a ceiling of 1000 feet and the minimum 3 miles for visual flight conditions. The pilot was starting to indicate panic in her voice as she talked with the Salt Lake Center controller. All of us "upstairs" just listened, not wanting to interfere with the controller's efforts. We also learned that this had been going on for a while, and with fuel now starting to become a concern, the controller was working hard to get this plane on the ground.

The private plane had a single VHF omni range (VOR) receiver. It was tuned to the Bozman VOR. With VHF aircraft communications and navigation signals being generally "line of sight," the Bozman VOR was the only navigation tool she had to work with at her altitude. A quick, positive radar identification of the plane and a firm position was an absolute necessity. The pilot knew this, and so did the controller. As the conversation continued, it was clear that the plane was too low for the Salt Lake Center remote radar site to pick up. The plane had no transponder. In order for the controller to give the panicked pilot a safe radar vector to Bozman, he had to know where she was.

The controller asked the pilot if she had a good signal on the Bozman VOR. She replied that it was a good signal, and that she must be really close. She could not see the ground, and in her position, was on top of the clouds. With no actual radar contact of the plane, the controller was working quickly to determine a position.

"What is your bearing to or from the Bozman VOR now, and radial?" the controller asked. The pilot replied, "I am on the 360 degree radial and flying to the VOR." Again, you could tell the pilot was very aware that she was in trouble. Winds were strong down low, as was clearly indicated by the clouds and the Bozman weather report.

"Hold your heading, and give me your radial now," the controller requested. The pilot replied, "I am now on a 200 degree heading, flying toward the Bozman VOR."

"Okay, hold that heading and let me know when you pass the Bozman VOR," the controller requested.

"There's something wrong with my navigation display!" the pilot replied.

"What's wrong?" the controller asked.

"I don't know. I am flying towards the VOR, but the radial keeps changing! I don't know where I am!"

Navigation Nightmare

As the conversation continued, the Federal Aviation Administration (FAA) team of controllers were on the phone with Bozman. Was there an instrument equipped private plane on the field that could get in the air, and if so, was there a qualified pilot who could fly the plane? Experience had alerted the controllers at Salt Lake to the fact that this pilot was not only in serious trouble, but that panic was now starting to set in. Also, with the ever-changing VOR radial, it was clear that either there was something truly wrong with the plane's VOR navigation system, or the pilot was now flying in the "cone of confusion," complicated by the strong surface winds.

Each VOR sends out a navigation signal that makes up 360 navigation radials (a magnetic course) to or from the station. Normally, to fly to a VOR, the pilot just tunes in the VOR signal. Next, he rotates the navigation instrument to get a "to" indication rather than a "from" indication, and with some wind correction, he centers the needle, reads the "to" radial, and flies that heading to the station.

When navigating with a single VOR receiver and display, often a pilot will get so close to a VOR that the radial he is flying will change rapidly because of his position to the VOR. The centered "to" the station needle keeps rapidly changing because radials all come together at the signal source. This is called the cone of confusion.

No Substitute for Experience

A passing airline pilot who was also a military flight instructor quickly voiced his opinion and agreed with the FAA controller. The pilot must be very close to the Bozman VOR. Weather conditions at Bozman were now getting worse. The ceiling was now down to less than 800 feet, and visibility had dropped to 2 miles in blowing snow. There could be a danger of ice on the wings if the private pilot entered the clouds.

On the ground, the Bozman FAA had located an experienced pilot and an instrument equipped plane. The pilot took off and was now in radio contact with the FAA center controller in Salt Lake City. The private pilot was now climbing to stay in visual conditions, and was given a suggested heading by the FAA controller. Since the controller did not have the private pilot in radar contact, he issued firm instructions to the pilot. "Do not fly into any clouds, as there are higher mountains in your area! Make sure you can see where you are going at all times."

With several more radio exchanges, the FAA guided the instrument qualified airplane in the general direction of the lost private pilot. Soon, visual contact was made, and the private pilot's position was confirmed. She was truly over the Bozman VOR, and had been trying to fix her position in the "cone of confusion," too close to the VOR station for accurate navigation. As the two pilots signed each other, the experienced pilot and instructor guided the private pilot to the runway and safety landed at Bozman.

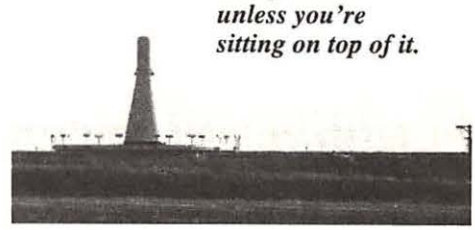
AM Mode for Safety in Aviation

Although you don't hear adventures of this magnitude every day on the aviation band, you do have real excitement possibilities almost every day. Private and commercial aviation has been made much safer today because of modern navigation, the ability to communicate with towers, approach radar facilities, and air route traffic control centers. Remote radar sites allow controllers in the ARTCC centers to watch and control aircraft at a density and speed unthought of just several years ago.

The private and commercial planes of today use AM as the mode of communications in the VHF aircraft band. This band starts at 108.050 MHz and runs up to 137.00 MHz. The lower portion of the band is used for navigation. For example, if close to a station on the ground, you can receive signals of the VOR station or of the instrument landing system (ILS) in the lower portion of the band. These signals sound like a tone of sorts, and are all identified with CW (Morse code), to allow pilots to identify the station or system being used. Always remember, too, a good, high antenna is almost as important as the receiver you use. VHF aircraft signals are to be thought of as "line of sight" signals.

Why do aircraft use AM as the communications mode when FM is used by the services just above and below the assigned aircraft band? The selection of AM was no accident. In fact, the Federal Communications Commission (FCC) feels so strongly about why the

A navigation aid such as a beacon or VOR is indispensable — unless you're sitting on top of it.



mode was chosen, that this question is included in many FCC radio exams. The AM mode was selected because of an undesirable characteristic of VHF FM radio signals.

To explain, do you remember the last time you were traveling in your car and listening to a marginal FM station playing your favorite music? As your distance from the station increased and the signal became weaker and weaker, suddenly another station on that same frequency "captured" your radio, and you could no longer hear your favorite station at all, yet you knew it was still there. This "covering" of the weaker station and the capturing of the FM radios ability to hear the weaker station is called "capture effect" by the FCC.

As far as the FCC is concerned, it is okay for one FM broadcast station to completely cover another weaker station. However, when lives and safety are a prime consideration, the FCC and FAA decided that controllers and pilots needed to know when two transmissions were taking place at the same time. By using AM communications, the signals do not capture, and there is a squeal or other noise to indicate that two people are transmitting at the same time. You'll often hear pilots double with each other or with the controller, and someone will say on the frequency... "blocked!"

It works well. And that is why all aircraft communications, both UHF and VHF, use AM mode.

Making the Most of Limited Bandwidth

Something else has recently taken place in the aviation band that you should know about. As the need for frequencies has increased, the FAA and the FCC have packed the frequencies closer together. Instead of using spacing that would go from, for example, 119.100 MHz to 119.150 MHz, the FCC has tightened the frequency spacing down to 25 kHz apart.

Even though you hear a controller give a pilot a frequency change to "119.37," for example, you'll need to enter the frequency in your scanner as 119.375 MHz. The last number is never mentioned by the controller or the pilot. Some scanners automatically add the additional "5" for you, but others may not do so. In airplane cockpits, most radio communications control heads do not show the additional number, either. The assignment of 119.37 MHz to a pilot is actually a frequency change to 119.375 MHz, but shows on his control head as only 119.37. The deletion of this last number keeps the amount of radio communication chatter down, and also makes for less chance of a mistake by the pilot.

TABLE I: Aeronautical Frequency Allocations

HF: Upper Side Band, 3 kHz spacing

2850 - 3155 kHz	6525 - 6765	15010 - 15100
3400 - 3500	8815 - 9040	17900 - 18030
4650 - 4750	10005 - 10100	21850 - 22000
5450 - 5730	11175 - 11400	23200 - 23350
	13200 - 13360	

VHF - 108 to 137 MHz
AM mode; Spaced in increments of 25 kHz

Most commercial jets and airliners have three VHF communication radios on board. Generally speaking, each radio has two frequency displays with a switch to allow the pilot to quickly tune and switch frequencies on the same radio control head. By keeping the old frequency displayed, and entering the new frequency in the other position, the pilot can quickly switch back to the old frequency in the event "nobody is home" on the new frequency.

One VHF radio is used for air traffic control (ATC) communications. This radio is normally the "number one VHF," using the top or best antenna on the plane. The second VHF radio is normally used for ACARS monitoring and transmitting, and the third is used for company or other communications. It is also the backup VHF in the event the #1 VHF radio fails. Most business or corporate planes have two VHF radios. Private planes, depending on the wealth of the owner, have either one or two VHF radios.

I could fill this magazine with frequency lists used by VHF aviation. Though that is not the purpose of this article, we'll give you a broad overview of the bands in Table I, and a look at some nationwide frequencies that should hit the jackpot on your first try in Table II.

There are many frequency directories that list HF, VHF, and UHF frequencies. These books also give you more helpful hints on how to listen and understand what you are hearing. We'll get you started with a few recommended sources available from Grove Enterprises, Universal Radio, and other dealers.

Other Resources

If you are a serious aviation listener, you should perhaps pay a visit to the fixed base operator on your local airport. This is the "general store" for pilots. Maps, such as the US Government published Sectional Charts, are always available from the fixed base operations desk. They are colorful, large, and packed with information and frequencies for the area being covered.

WAC, or World Aeronautical Charts, are also useful and cover a wider area than the Sectional Charts. The maps are not expensive and are updated on a regular basis. As you listen, especially during periods of bad weather or thunderstorms, you will find the five letter names of the airway intersections useful and interesting. All of this information is shown in detail on the Sectional Chart.

I also suggest (as long as you are visiting the fixed base operations store), that you ask if they have an inexpensive booklet of approach charts or area charts for your local area. Aviation charts are all dated. The information constantly changes. When the charts go out of date, it is "illegal" for pilots to use them. As they are revised, the old charts are just thrown away. Perhaps with some friendly conversation, you can arrange for a small box of "out of date" goodies that would be free. Just a thought ...

There are many companies that provide aviation materials to pilots. Jeppesen, in Englewood, Colorado, is probably the best known and the most widely used (call 800-621-5377 or go to their **www.jeppesen.com** web site). If you are a devoted, high dollar, aviation listening buff, you can find ads for these materials in most over-the-counter aviation magazines.

The Changing Nature of Communications

The ACARS data communications up and downlink system could also fill a book. The system is extensive and can be extremely interesting. Many times, airline pilots will send "confidential" messages via ACARS rather than talk to the company radio operator or dispatcher using voice communications. ACARS is used by most commercial airlines and by business aviation.

Keep in mind that ACARS for all airlines is normally found on the same frequency, 131.550 MHz. Although there are other frequencies that are used as a backup in the event 131.550 MHz becomes congested, this is the main frequency for data. You will need a book on ACARS to understand the message headings, although the text itself is plain and easy to read.

The electronics in the modern airliner is extensive. In addition to the VHF radios, ACARS, and the weather radar, you'll normally find two transponders. The transponder is a device that automatically adds useful and identifying information to the image of the

plane on the radar screen. The latest models have an altitude reporting feature; all have a four digit, selectable code. The code, when programmed into the FAA air traffic control system, lets the controller see not only the airline and flight number, but the altitude, speed, and other useful information — all displayed on the radar scope.

Normally, there are also two or more VOR and ILS receivers. These receivers either display the navigation information directly or work with the flight management system (FMS) computers to assist in navigation for the flight. We could write several books on the flight management systems used today, not to mention the new global positioning satellite (GPS) navigation systems that are starting to be used extensively. The interface of GPS navigation and FMS will make flying less expensive, faster, and more navigationally correct.

Although there are books and articles everywhere these days on ACARS, let me add just a few comments before we leave the subject. ACARS is just beginning to become a primary tool of control and communication. Initially, when ACARS started, it was used just to send text messages back and forth between the pilots and the company. Then, ACARS was tied to the closing of the aircraft door and the activation of the red flashing beacon. When both are activated, ACARS automatically sends departure and arrival times — no more hand written pay sheets for pilots to complete.

ACARS is now being used many airlines such as US Airways and American for weight and balance departure information. Companies such as Delta are equipping their ACARS planes to send position reports every two minutes, transmit engine readings, and to get connecting gate information for passengers well before arrival. Crews are even notified by ACARS if the "personnel representative" is waiting with a drug or alcohol test.

Soon, ACARS will be tied into flight data recorders, the black boxes we hear about folowing accidents. These new systems will report as many as 50 conditions, alerting the airline to any irregular operations of the aircraft during flight.

Monitoring the VHF aircraft communications band can be as cusual or as intensive a hobby as you care to make it. The aero band can truly be one of the most interesting and exciting on your scanner today, especially if you have some insight into what is actually taking place! The more you monitor, the more you'll get drawn into the drama of the airways over the airwaves.

TABLE II: National Civilian Aeronautical Band Assignments

By Larry Van Horn, Assistant Editor, *Monitoring Times*

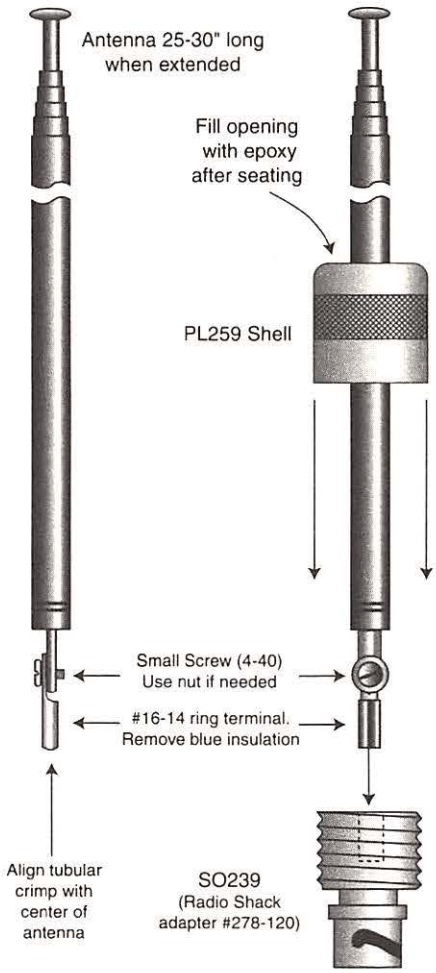
Frequencies MHz, 25 kHz spacing	
108.000-117.950	VHF omni-range
108.100-111.950	ILS localizers
118.000-121.400	Air traffic control (towers/centers)
121.500	Civilian aircraft emergency
121.600-121.925	Ground control (25 kHz spacing)
121.950	Flight schools
121.975	Flight service stations (private aircraft)
122.000	Flight service stations (national flight watch-private aircraft)
122.025	Flight service stations (private aircraft)
122.050	Flight service stations (aircraft transmit)
122.075	Flight service stations (private aircraft)
122.100-122.675	Flight service stations (private aircraft transmit)
122.700	Unicom (uncontrolled airports)
122.725	Unicom (uncontrolled airports-private aircraft only)
122.750	Unicom (private air-to-air fixed wing)
122.800	Unicom (uncontrolled airports)
122.825	ARINC/Airline company frequency (aero enroute)
122.850	Multicom/NOAA severe storms study aircraft/U.S. Forest Service helicopter operations
122.875	ARINC/Airline company frequency (aero enroute)
122.900	Multicom/U.S. Coast Guard search and rescue/U.S. Forestry Service fire cache air operations/Numerous government agencies and military services
122.925	Multicom (plane-to-plane)/NOAA severe storms study aircraft/NASA research aircraft/ National Park Service aircraft/Numerous government agencies and military services
122.950	Unicom (controlled airports)
122.975	Unicom (high altitude)/U.S. Forest Service air operations
123.000	Unicom (uncontrolled airports)
123.025	Unicom (helicopters/air-to-air)/U.S. Forestry Service helicopter (helispot) operations
123.050	Unicom (heliports)/NOAA severe storms study aircraft/U.S. Forestry Service helicopter (helispot) operations
123.075	Unicom (heliports)/U.S. Forestry Service helicopter (helispot) operations
123.100	U.S. Coast Guard/Civil Air Patrol search and rescue
123.125	U.S. Air Force NAVAID flight check
123.125-123.475	Flight Test (Itinerant: 123.125/.150/.175/.400)
123.200	Flight schools
123.300	Flight schools/balloons
123.400	Flight schools
123.450	Multicom (air-to-air informal)
123.500	Flight schools/balloons
123.525-123.575	Flight Test (Itinerant: 123.575)
123.600-128.800	Air traffic control (towers/centers)
126.200	U.S. military control towers/ground controls
128.625	NASA/NOAA research frequency
128.825-132.000	ARINC/Airlines company frequencies
132.025-135.975	Air traffic control (towers/centers)
134.100	Military airports (ground controlled approach radar)
135.850	Federal Aviation Administration/U.S. Air Force/U.S. Army NAVAID flight inspection
135.950	Federal Aviation Administration/U.S. Army NAVAID flight inspection
135.975	U.S. Forestry Service air-to-ground (wildfires)
136.000-136.075	Air traffic control operations
136.100	Reserved for future unicom or automatic weather obseration stations
136.125-136.175	Air traffic control operations
136.200	Reserved for future unicom or automatic weather obseration stations
135.225-136.250	Air traffic control operations
136.275	Reserved for future unicom or automatic weather obseration stations
136.300-136.350	Air traffic control operations
136.375	Reserved for future unicom or automatic weather obseration stations
136.400-136.450	Air traffic control operations
136.475	Reserved for future unicom or automatic weather obseration stations
136.500-136.875	aeronautical enroute (domestic VHF)
136.900-136.975	aeronautical enroute (domestic/international VHF)

TABLE III: Basic reference materials

Aeronautical Frequency Directory by Robert Coburn (Official Scanner Guide)
Air Scan by Tom Kneitel (CRB Research Books)
Air Waves by Laura Quarantiello (Tiare Publishing)
Grove Shortwave Directory, edited by Larry Van Horn (Grove Enterprises)
Understanding ACARS by Ed Flynn (Universal Radio Research)
The Worldwide Aeronautical Communications Frequency Directory by Bob Evans (Universal Radio Research)

The "Junk-Drawer" Antenna

By Ed Muro,
Design by Henry Brown



Using Scraps to Take Your Handheld to New Heights

For the past couple of years I have been experimenting with several "Premium" handheld scanner antennas such as the Austin Condor, the Watson-801, and Diamond RH-77A. While these high cost antennas outperform the rubber duck that came with my handheld, it sure has been an expensive experiment.

Last year I was explaining my needs to a fellow scanning enthusiast, Henry Brown, when he told me he had a real cheap answer to meet my needs. Not only was it cheap, but his home brew antenna outperforms some of the more expensive replacements. The following directions will allow you to build the same antenna that Henry has devised in not too much time at all.

Henry Brown has been a radio hobbyist since 1962. He is a resident of Cape Cod, and monitors primarily Coast Guard and Air Force / Air National Guard frequencies. Henry also maintains the FCC call sign, N1SNH. The "Junk-drawer" antenna was devised in an attempt to improve monitoring military and civilian aircraft frequencies, but I have found it works well at all frequency ranges.

If your handheld scanner uses an antenna with a BNC connector, this easily built antenna will greatly improve reception of distant stations over a standard "rubber duckie." Best of all, it can be assembled in a few minutes using parts often found in the junk-drawer of many scanner enthusiasts, or readily available at your local Radio Shack.

Junk parts needed:

Before beginning assembly, you will need a male BNC to SO-239 adapter. Radio Shack's part number 278-120 will do fine. Next, dig in your junk-drawer and find an old PL-259 connector. Remove the shell — that's the part you'll use! Keep digging, and look for a #16-14 ring terminal (good quality) — the type with a blue insulator.

Then, keep digging! Find an antenna from an old cordless phone base unit — the type with a flat flange at the base (see sketch). The antenna should extend 25 or 30 inches or more.

Next, a small 4-40 x 1/4 inch long or similar pan head screw with nut is required. You may need to vary the size of the screw, depending on the size of the hole in the antenna flange. Keep the length as short as possible.

Finally, you'll need some epoxy adhesive. You will probably use an entire "kit" for this project. Any good quality epoxy will do.

For tools, you will need an X-Acto knife, a small screwdriver, needle nose pliers (if you use a nut), and a popsicle stick for mixing epoxy.

Construction:

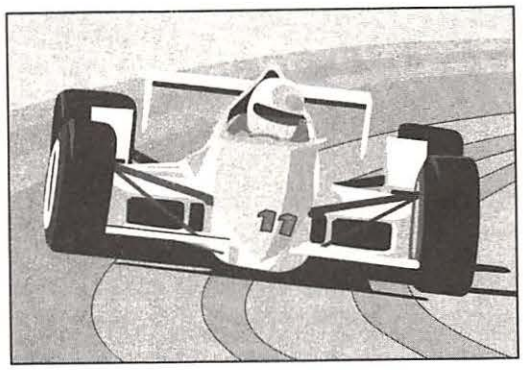
Start by carefully removing the blue insulator from the ring terminal. The X-Acto knife should easily accomplish this. Take care not to crush the metal tubular crimp. After removal, test the diameter of the tubular crimp by pushing it into the female socket of the SO-239 connector. It should fit snugly, not overly tight and definitely not loose. If it is loose, you may be able to pry apart the tubular crimp slightly to increase its diameter.

Next, attach the ring terminal to the flange at the bottom of the antenna, using the small screw. The flange may have a tapped hole; if so, use it. If not, use the nut to hold the ring terminal to the flange. Note that the tubular crimp should be in line with the centerline of the antenna. This centers the antenna when it's mounted ... By the way, you're almost finished.

The final steps involve pushing the tubular crimp into the SO-239 socket, and dropping the PL-259 shell over the top of the antenna. Screw the shell firmly down onto the SO-239. Now align the antenna element so it's perfectly straight when viewed from all sides. No part of the antenna/screw/ring terminal assembly can short to the PL-259 shell. Visually check this before filling the cavity with epoxy. Use an ohmmeter if you have doubts.

Next. prepare a batch of epoxy, and you might as well mix the entire kit. Then, using the popsicle stick, carefully spoon the epoxy into the PL-259 shell, filling it to the top. Be sure the antenna element is fully retracted and place the assembly upright on a steady, flat surface to cure. Wipe any excess epoxy from the rim of the shell and be certain epoxy does not seep from the threaded area. That's it, you're done!

This antenna certainly pulls in signals the stock antenna will never receive, and it won't overly strain the BNC connector on your scanner. It is subject to bending stress, so use it carefully. It's a great antenna, especially if you use your handheld as a base station unit.



More Racing Freqs for Racing Freaks

A La CARTe

By Mike Bryson

It's old news that July is one hot month, but here is something new: it's even hotter if you are a CART fan. This month the Championship Auto Racing Teams (CART) has their big race of the season, the U.S. 500 at the Michigan International Speedway. This is the race that, on July 27th, is supposed to rival the Indy 500.

That's right: CART isn't racing in Indianapolis anymore. That's controlled by CART's "rival" racing organization the Indy Racing League (IRL). These two sanctioning bodies parted ways last year ... but that's another story. CART is often referred to as "Indycars," but that, too, is likely to change, due to the IRL folks.

Unlike the NASCAR stock cars, CART doesn't even try to give the appearance of being "stock." These cars make use of the hottest new technologies available, including being outfitted with the latest in RF and microwave telemetry. This allows remote data acquisition during the race to keep pit crews on their toes. The data that are typically monitored include engine and tire temperatures and pressures, suspension, throttle, break positions and information, lap times and speeds, and, of course, gas mileage. This is sent for each lap! The explosion of information is handled by a 64-channel microwave receiver.

With CART racers blistering around the track at over 220 mph, aerodynamics is extremely important to the cars' handling. At these speeds the cars would be literally flying if it were not for the assistance of wings holding them down on the track. (That's a switch!) This added downforce allows the cars to corner at much greater speeds would be possible using the race car body alone.

Although they have wings, these cars have as little wind drag as possible; there isn't even a roof on these cars! This type of racer is called an "open wheeled" racer because it has no lid. I guess it keeps the drag down and the driver from toasting. (Don't forget the sunblock for yourself, though.)

Aerodynamics is not the only thing that helps keep these cars at rocket speed. The engines found in a typical CART racer are unique to this series and are capable of turning 14,000 rpm while producing approximately 800 horsepower. That is a ton of rpm for a V8 engine; it has the sound of a very large Dremel tool (and I mean *large*). These engines use the best materials and technology that money can buy, ... but you can't actually buy them. The engines are leased for the season for close to 2 million dollars from Ford Cosworth, Honda, Mercedes-Benz, or Toyota. And you thought your lease plan was a whopper!

Frequency search

Locating updated frequencies for the CART teams and drivers on the Grove FCC Database can be quite a challenge if you do not know the individual car owners and teams. I found the team owners on the internet and then searched for these on the FCC Database. I could have easily pulled the driver/team frequencies off of the internet, but I found that CART frequencies apparently were not updated from 1996 on most sites.

Some sites like **www.speedcenter.com** looked promising, but I wanted to reference their freqs back to the Grove FCC Database just to be on the accurate side. I found a 1997 Driver/Team lineup on the **www.cart.com** site to use as a team owner reference, but it unfortunately did not contain any frequencies. However, using this team owner info to search the Grove FCC Database proved that the "speedcenter" freqs were in good shape.

The search also turned up more frequencies per team than posted on the SpeedCenter site. For example, a search for Chip Ganassi Racing Teams turned up the following frequencies not listed under the two team drivers: 461.1125, 461.5125, 461.5625, 461.6125, 461.6625. It's worth investigating these unposted frequencies if you have a chance to catch some CART action. Check out the CART schedule included here as well as the "speedcenter" freqs. Notice the Safety Crew codes at the bottom of the list.

If stock car racing is not hot enough for you this month, check out some of the blazing action of the CART series if you get a chance. A really good start would be the U.S. 500 on July 27. These folks blow the lid right off racing!

1997 Scanner Frequencies

Courtesy **www.speedcenter.com**

CAR # Driver	Frequency	Alternate	Alternate 2
1 Jimmy Vasser	467.0375	464.0375	462.2625
2 Al Unser Jr.	854.8375	852.1875	855.7875
3 Paul Tracy	856.7875	859.8375	858.8375
4 Alex Zanardi	469.8875		
5 Gil de Ferran	461.0625	463.2375	461.0125
6 Michael Andretti	461.2875	468.3625	468.2250
7 Bobby Rahal	469.2625	468.2625	463.8875
8 Bryan Herta	464.7875	462.8125	467.8375
9 Dario Franchitti	858.8875	854.8375	
11 Christian Fittipaldi	461.7125	462.6500	468.3625
16 Patrick Carpentier	853.4875	855.5875	
17 Mauricio Gugelmin	468.4625	466.7625	
18 Mark Blundell	466.7625	461.7625	
20 Scott Pruett	466.5375		
21 Richie Hearn	xxx.xxxx		
24 Hiro Matsushita	461.7375		
25 Max Papis	467.7500	467.8000	468.8125
27 Parker Johnstone	xxx.xxxx		
31 Andre Ribeiro	469.2125	467.3125	
32 Adrian Fernandez	464.5125		
36 Juan Manuel Fangio	857.0125	463.7375	
40 Raul Boesel	see #20		
64 Dennis Vitolo	461.4625	463.2375	
98 PJ Jones	856.8125		
99 Greg Moore	468.4875	466.8875	
CART 1	457.0125		
CART 2	457.1875		
CART	457.5250		
CART	451.8125		

Safety Crew - Driver's Codes

Code 1: Conscious and coherrent, uninjured
Code 2: Slightly disoriented, midly bruised
Code 3: Requires Ambulance
Code 4: Requires Helicopter due to serious injuries

THE OFFICIAL SITE OF THE PPG CART WORLD SERIES

1997 Indy Car Schedule

Date	Race	Location	Ticket Info	Network
July 13	Grand Prix of Cleveland	Cleveland, OH	216-781-3500	ABC
July 20	Molson Indy	Toronto, ON	416-872-4639	ABC
July 27	U.S. 500	Brooklyn, MI	800-354-1010	ABC
Aug 10	Miller 200	Lexington, OH	800-MID-OHIO	ABC
Aug 17	Texaco/Havoline 200	Elkhart Lake, WI	800-365-RACE	ESPN
Aug 31	Molson Indy Vancouver	Vancouver, BC	604-280-INDY	ESPN
Sep 7	Grand Prix of Monterey	Monterey, CA.	800-327-7322	ESPN
Sep 28	The California 500	Fontana, CA.	800-944-RACE	ESPN

Hot Racing Freqs for the Race Cars "Without a Lid"

1997 Driver/Team Lineup

No.	Driver	Country	Team
1	Jimmy Vasser	USA	Target/Chip Ganassi Racing
2	Al Unser Jr.	USA	Marlboro Team Penske
3	Paul Tracy	Canada	Marlboro Team Penske
4	Alex Zanardi	Italy	Target/Chip Ganassi Racing
5	Gil de Ferran	Brazil	Walker Racing
6	Michael Andretti	USA	Swift Newman/Haas Racing
7	Bobby Rahal	USA	Team Rahal
8	Bryan Herta	USA	Team Rahal
9	Dario Franchitti (R)*	Scotland	Hogan Racing LLC
11	Christian Fittipaldi	Brazil	Newman/Haas Racing
16	Patrick Carpentier (R)*	Canada	Bettenhausen Motorsports
17	Mauricio Gugelmin	Brazil	PacWest Racing Group
18	Mark Blundell	England	PacWest Racing Group
19	Michel Jourdain, Jr	Mexico	Payton Coyne Racing
20	Scott Pruett	USA	Brahma Sports Team
21	Richie Hearn	USA	DellaPenna Motorsports
24	Hiro Matsushita	Japan	Arciero-Wells/Panasonic Racing
25	Max Papis	Italy	Arciero-Wells/MCI Racing
27	Parker Johnstone	USA	Team Kool Green
31	André Ribeiro	Brazil	Tasman Motorsports Group
32	Adrian Fernandez	Mexico	Tasman Motorsports Group
34	Paul Jasper	USA	Payton Coyne Racing
36	Juan Fangio II	Argentina	All American Racers
40	Raul Boesel	Brazil	Brahma Sports Team
64	Dennis Vitolo	USA	Project Indy
77	Gualter Salles (R)*	Brazil	Davis Racing
98	PJ Jones	USA	All American Racers
99	Greg Moore	Canada	Player's Forsythe Racing Team

(R) Rookie Driver
* Pending approval of the series Chief Steward

Dan Veeneman
dan@decode.com

The Race is On

A traditional economic rule of thumb is that when supply exceeds demand, the price does down. The same appears to hold true for radio spectrum, especially after the most recent FCC auction (number 14, for those of you keeping count). On April 25th the FCC finished the Wireless Communications Services (WCS) auction, awarding 128 licenses to 17 of the 23 participants. The bids totaled just over $13.6 million, which proved rather disappointing to Congress, who in their zeal to balance the budget were counting on WCS to raise $1.8 billion.

They were also in such a hurry for the money that they ordered the FCC to begin the auction by April 15 and have the proceeds deposited no later than September 30, the end of the government fiscal year. Their disappointment may turn into legislation that will slow down the auctioning process and give industry and the FCC a chance to catch up. The poor showing also bodes ill for the Clinton Administration, whose 1998 budget proposed raising $36 billion from such spectrum auctions.

The Wireless Communications Services allocation is made up of four blocks of frequencies in geographic areas similar to narrowband PCS. Two paired blocks of 10 MHz, the A and B blocks, are licensed in each of 52 Major Economic Areas (MEAs). Two unpaired blocks of 5 MHz, the C and D blocks, are licensed in each of 12 regional economic area groupings (REAGs), which cover a much larger area than the smaller MEAs. The FCC hopes these large regional areas will promote economies of scale and encourage manufacturers to quickly develop technology to efficiently operate in those frequencies.

TABLE 1: WCS Frequency Blocks

Block	Lower	Upper	Total Size
A	2305 - 2310 MHz	2350 - 2355 MHz	10 MHz
B	2310 - 2315 MHz	2355 - 2360 MHz	10 MHz
C	2315 - 2320 MHz		5 MHz
D	2345 - 2350 MHz		5 MHz

With such a short time for potential service providers, equipment manufacturers, and investors to study the proposed auction, relatively few detailed plans were made public, but it is expected that WCS will be used for such purposes as wireless high-speed access to the Internet, a return link for interactive cable television, wireless local loop telephone service, and radiolocation services for vehicles.

The FCC also had little time to develop effective rules for the service, and spent a good deal of effort dealing with interference issues. Their initial plan was to allow WCS transmitters to operate at essentially unlimited power, but since WCS frequencies border the spectrum set aside for satellite digital audio radio service (DARS), there was a potential for significant interference.

After hearing opposition from potential satellite DARS operators, the FCC relented and limited WCS fixed land and radiolocation land stations to 2,000 watts peak EIRP and WCS mobile and radiolocation mobile stations to 20 watts EIRP. Additional out-of-band emission limits prompted the FCC to note that mobile service in the C and B blocks is unlikely for the foreseeable future.

■ Image Reception at PCS Frequencies

Some unintended interference from PCS systems appears to be affecting multichannel multipoint distribution systems (MMDS), which can send up to 33 channels of analog video in blocks in the 2 GHz range, the largest of which goes from 2500 MHz to 2686 MHz. Standard MMDS equipment uses a mixer and a local oscillator running at 2278 MHz to convert this block to a much lower intermediate frequency (IF), which is much easier for the set-top boxes to use.

It turns out that this local oscillator is just as far below the MMDS frequencies as it is above PCS frequencies, so unfiltered downconverters or units with poor image rejection will allow PCS frequencies to enter the mixer and produce signals strong enough to destroy MMDS reception. This is a familiar problem to many scanner owners whose units don't provide sufficient filtering, but it's interesting to note that it happens to other people's equipment as well.

Until recently this hasn't presented much of a problem, since PCS networks were still in the planning stages, or were operating at lower power levels. Now that systems are coming on line and transmitting at operational levels, MMDS operators are receiving a lot more complaints about poor reception. The solution? Better filters on the MMDS downconverters, which are not that expensive but will be time-consuming for technicians to upgrade each installation that needs it.

WIRELESS COMMUNICATIONS SERVICE FREQUENCY ALLOCATIONS (MHZ)

■ Competition is Lowering Prices

Wireless Communications Services should eventually mean more competition to some 1.9 GHz Personal Communications Services (PCS) offerings, but cellular customers in many parts of the country are already feeling the benefits of PCS competition. According to recent studies, established cellular service air time prices have fallen in places where PCS has become available. For example, one study examined 30 cities and found cellular rates significantly lower in those that are served by PCS providers.

According to the Yankee Group, in cities with only cellular providers, air time prices have dropped only 10% in the past three years. In that same time period in cities with PCS competition, air time rates dropped an average of 25%. In Washington, DC, for instance, Sprint Spectrum entered the market in 1995 with rates about 30% below those of competitors Bell Atlantic Nynex Mobile and Cellular One. BANM and Cell One have lowered their rates since then, coming down to a level only 10% or so above Spectrum's.

While this is good news for consumers, it's not so good for some PCS companies. Cellular providers have had a decade or more to build out their networks, and paid little or nothing for their licenses. PCS providers have had less than two years to establish coverage and are saddled with very large debts for equipment and licenses.

Another recent study suggests that PCS providers are selling air time below cost to attract customers, but that financial conditions will not allow them to do so for long. With the potential for five wireless providers in each market region, competition is expected to be fierce, and companies will have to specialize in order to survive.

Traditional cellular providers in major markets have had very healthy profit margins for quite some time, and have the breathing room to rapidly reduce prices. Whether they do so remains to be seen, but PCS companies will need to focus on their many advantages over cellular, including call privacy, security, better voice quality, and data messaging. Many consumers also appreciate the simple sign-up procedure and no-nonsense service agreements, and these "customer-friendly" features will become more important as competition heats up.

Further down the road, as air time prices continue to drop and usage goes up, at some point consumers will begin to replace their landline home telephone with cellular or PCS service. This landline displacement typically occurs at around 300 minutes a month, and with most PCS systems offering caller ID, call forwarding, voicemail, and other advanced services, price is the remaining barrier to having your home phone with you wherever you go. Many highly mobile professionals have already canceled traditional local telephone service and rely entirely on their wireless phone to keep in touch. Some businesses have already found it less expensive to provide their sales force with a mobile phone than to pay for an underused office telephone number and voicemail system.

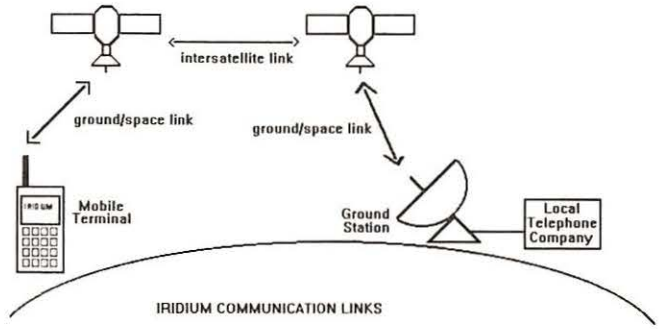
■ Rigged PCS Auctions?

When the PCS auction for the D, E, and F frequency blocks closed on January 14th of this year, 1479 licenses went to 125 winners, generating about $2.5 billion in revenue. As noted in the April *PCS Front Line* column, this amount was quite a bit lower than what was expected. It seems the Department of Justice has taken an interest in the auction proceedings, and the anti-trust division is "looking into the possibility of anti-competitive conduct by bidders in connection with the FCC's auctioning of spectrum for PCS."

There is a suspicion that several auction participants used the last three digits of their bids to signal their intentions to other bidders, helping each other keep bids low despite strict anti-collusion rules. At least one top license winner, AT&T Corporation, has received a civil investigative demand from the Justice Department, requesting information on bidding strategies, bid amounts, and communication about the auction with other bidders.

■ PCS Reaches the Final Frontier

World-wide PCS service took a major step forward on May 5th at 10:55 am EDT when a McDonnell Douglas Delta II rocket lifted the first five of 66 Iridium satellites from Vandenberg Air Force Base in



California into transfer orbit. Sixty-three minutes after launch the satellites were deployed, and are scheduled to undergo a series of tests while being moved into final orbits. Ground controllers will confirm their ability to fly the satellites by commanding and controlling them, and will monitor the health and status of each satellite via telemetry. The L-band communication links between the satellites and subscriber voice and paging units will be tested, as well as the north-south inter-satellite links.

Iridium had hoped to complete this first launch back in January, but the unexpected explosion of a nearly identical Delta launch vehicle caused them to delay until the cause could be discovered. High upper-level winds at Vandenberg delayed launch attempts earlier in the month.

When fully populated, the Low Earth Orbit (LEO) system will consist of eleven satellites in each of six orbital planes about 400 nautical miles above the Earth. Iridium plans to offer world-wide voice service from handheld terminals, as well as short message paging and data transmission.

That's all for this month. More information on PCS and satellites can be found at the *PCS Front Line* website at **http://www.grove.net/~dan**. I wecome comments, suggestions, and even criticism at *dan@decode.com*. Until next month, happy monitoring!

Richard Barnett
ScanMaster@aol.com

More New Portable Scanners!

At a time when the industry is in the midst of an obvious slump, there is something afoot in "scanner-land" that is absolutely astounding, perhaps even inexplicable. There are now, suddenly, more scanner manufacturers than ever before. We've discussed some of these new players of late, but let's take a closer look at many of these new portables and their makers.

1. RELM HS-100 and 200

RELM, a company which we've been discussing in this space, has introduced two fine portables and is soon to debut their new mobile scanner. What we especially like about the new RELM products is the metal-encased circuit board which, while making the portables somewhat heavy, unquestionably helps to reduce interference. The tradeoff is a worthwhile one.

The other feature which has everyone talking is the inclusion of CTCSS and DCS (PL/DPL) capability. Not only is DCS revolutionary for a scanner, to put any kind of tone-squelch in a portable scanner (it's been done in ham radios for years) is remarkable. The combination of these two features, as well as a reasonable price for the radios, makes the RELM portables the scanners of choice at the race track ... a high-profile selling venue that other manufacturers desire.

2. Radio Shack PRO-64

Radio Shack has introduced their PRO-64 portable, a scanner manufactured by GRE for the 6000-store national chain. While we have personally not yet seen this radio, we are told it contains 400 channels, is triple-conversion, and includes a computer-interface capability. GRE is known for their fine equipment and this radio will likely be a worthy contender in the portable market, although its lack of tone-encoding and trunktracking will put it at an immediate disadvantage for anyone scanning in a metropolitan area.

3. Alinco Portable

Alinco, the ham radio manufacturer, showed off their new portable scanner — excuse me: *wideband communications receiver* — in a dealer booth at the recent IWCE (International Wireless Communications Expo) in Las Vegas. This was a real shocker, since we had thought that the market for $500 portable scanners was already over-saturated.

This radio has 1200 channels (what would we do without those extra 200 channels!), all mode, multi-function, 500 kHz to 2 GHz approximately, etc., etc.. The radio had alpha-numeric capability, a band-scope, computer-control and all the other high-end features associated with the ICOMs and AORs. The audio and sensitivity of the radio appeared impressive in the short time we had to play with it.

But really, how many customers are there for these expensive toys? If you already have an AOR 8000 (nicknamed the "8K"), are you going to splurge and buy this Alinco or the ICOM R-10?

4. ICOM R-10

Ever since the introduction of the 8K, many people had wondered when ICOM would produce a competitive radio. Perhaps it was because the AOR was such an impressive radio that ICOM took its time. They could not produce a product of lesser quality and compete on the same playing field.

(When the 8K first came out, its debut was akin to Bearcat's introduction of the first portable programmable scanner, the 100. That 16-channel unit was one of the most anticipated radio releases of all time. The reason? People wanted to be able to program any frequency into a scanner while on the road. It had to be easy and quick to program, and that it was. Admittedly, many people had their 100s die on them, but it was still a tremendous achievement in its day.)

The ICOM R-10 has been discussed in detail by others. Suffice it to say that what sets the radio apart from the 8K is its size and a built-in CI-V port. The radio is much smaller than the AOR unit, and in a portable, you can't beat a compact frame.

5. Diamond/Welz WS-1000E

We're going to save a detailed discussion of this wunderkind radio for a later issue. Briefly, though, the WS-1000E is an amazing little device. While it's not available for sale in the U.S. (it currently includes the cellular band), the radio is worth consideration for overseas markets or if and when a cellular-less version is offered in the states. What's so astounding about this radio? Well, first, no one knows about it. Second, it's absolutely tiny: practically microscopic by portable scanner standards. The radio is smaller than a deck of cards! Yet, it has a beautiful shape and feel to it.

This radio, brought to you by, we understand, the same folks who have brought us the fine discone antenna, operates on two AA batteries! It's wideband (500 kHz to 1.3 GHz), includes a signal strength meter, AM-FM and WFM modes, selectable step, 400 channels (only four banks of 100 channels each), VFO, and much more.

What's so slick about the WS-1000E, besides its remarkable size, is that the key layout, beep tones, and other facets of the radio are all unique. It has a "fun" feel to it that wows everyone, scanner buff or not. On

top of all that, the sensitivity of the radio is quite good.

On the down side, the radio is prone to what appears to be internally generated noise or some other type of interference. (Bob Parnass would have to run some tests to give us all the straight scoop on this issue.) Also, the radio is not the easiest to operate. Bottom line: The WS-1000E is a radio to watch out for in the future.

6. Uniden-Bearcat BC-235XLT TrunkTracker

We won't go into great detail here about the 235XLT. It's the most talked-about scanner in 20 years and you have all heard and read about it before. In addition, Bob Parnass gives it his review this month on page 94. Let's just say that if you live in an area with Motorola analog trunking, you need this radio. It's that simple.

But it's not only a question of need. The 235 offers perhaps the most fun you could have with a scanner. Discovering talkgroup ID's and determining their use, is a blast. It's akin to searching a band without having a frequency book or CD-ROM to help you figure out who a particular user is.

Group ID's are all brand-new and, as of yet, nowhere published. A web site **www.trunktracker.com** should be up and running by the time this *MT* issue is mailed. Also under development is a TrunkTracker list server hosted by Grove Enterprises for exchanging group ID's. Both of these resources will provide a forum for trading ID's and developing lists.

Back to the 235 for a moment. The radio has 300 channels, as opposed to the 200 channels of the BC-220/230 model and it can be used as a conventional scanner. The 235 also has improved filtering and image rejection. If you've been considering a 230, there really is no reason to buy it in place of the 235, even if there's no trunking within hundreds of miles of you. The 235 is very reasonably priced (under $300) and should command few extra dollars over the 230, despite the fact that the 235 contains the most advanced technology in any scanner since the first programmables were built some two decades ago.

7. Yupiteru MVTs

This author has not had the opportunity to try out the Yupi's which have recently come on the market in Europe. We understand they have fine features and sensitivity. We hope to have the chance to test them for a later article.

■ Which is Your Pick?

So, with so many new portables on the market, which portable should you purchase? It's a question of use.

Are you going to the race track with the scanner?

If so, right now the choice would have to be the RELM (the HS-200 with 800 MHz if you're going to an Indycar event) because of its ability to limit interference at the transmitter-intensive tracks. A second option might be any of the $500 portables if you would like to see the driver's name appear in an alpha-numeric display each time a channel is active.

Are you using the scanner in a region with Motorola trunking?

Obviously, the answer here is the new Uniden TrunkTrackers. The BC-235 also has excellent image rejection, solid audio, and more. This 300-channel all-purpose portable is a fine choice for general scanning as well.

Do you require a surreptitious or lightweight scanner? A radio which can be carried through a mall or casino with no one noticing, or to a ballpark without the radio getting in the way as you jump up for the "wave"?

The Diamond/Welz is the answer here. You can set the Diamond to receive the AM broadcast of the ballgame's play-by-play or you can easily monitor stadium security with the scanner. It's very small, yet it has impressive audio. (By the way, we actually despise the "wave.")

Do you require computer-control, for programming or for reaction-tuning with a Optoelectronics Scout?

For high-end frequency-finding and scanning functionality, the ICOM, the ALINCO, and certainly the AOR AR-8000 are all going to be fine choices. Because the 8K has been around for so long, and because it was the first of the truly top-level portables (although the Yupi MVT 7100 may have appeared slightly before it), the AOR unit is always going to be the first choice of many serious professionals and hobbyists. The 8K is not that difficult to operate and provides a great receiver. A great deal has been written about the radio (all of which you can find in *MT* and/or online in the various forums) and a lot of software has been written for it as well. Numerous accessories are also available for this prized unit.

The intended uses for a scanner are practically endless, and thus you, as the customer, will have to make the final call on which scanner is right for you.

■ Scanner Priorities

This, though, brings us back to the question we've been asking in recent months: What features would the ultimate — in this case, *portable* — scanner include? A scanner which could provide the answer to all the questions above? A single scanner that could do it all?

No scanner is going to have absolutely every feature we're ever going to want. Here's my list of the most important features that I, personally, hope to see one day on the ultimate portable, in no particular order:

UTMOST IMPORTANCE

1. *Ease of programming*

The high-end, $500 portables are nice, but they can be such a pain to program. Especially if you have more than one of these units, you'll find you can't remember the keystrokes to enter a frequency into memory and get these radios to scan. Select-Scan, Mode-Scan, Skip-Scan, Banana-Scan, ... wow, great stuff, but how many of us use it?

These rarely-used operations make simple functions cumbersome (press the function key, hold down the 3 and the enter key, and stick your left pinkie in your ear....now you're ready to lockout a channel.) As someone who has designed scanner interfaces now on the market, I must say this has really gotten out of hand. There are better ways to implement feature-rich products without sending us all to school — or to an insane-asylum.

(The old ICOM R-1 portable might win the prize for the "Hardest Scanner to Program." Actually, that dog of a radio might even bag "Worst Scanner of all Time" except for the fact that ICOM was the first to offer a wideband continuous-coverage portable, and the unit's small size was impressive. ICOM was ahead of its time and they were to be commended for blazing the trail. Unfortunately, the R-1 went down in flames: Besides requiring an M.S. in Engineering to program, the radio suffered from the worst case of, shall we say, "adjacent-channel enhancement" we've ever seen.)

The ultimate portable scanner must be as easy to program as a $150 Bearcat 80XLT. On-the-fly, easy, rapid programming of channels as situations dictate is one of the primary uses of a portable scanner: Some of these $500 portables now offer "easy" modes which only take the complexity down a level or two. What we would like to see is a portable scanner which maintains a balance between price and performance; a radio that sells for under $500, or better yet under $400; which trades off over-engineered features for price; but also includes the following critical elements as desired features in the ultimate, reasonably priced, portable scanner (in no particular order):

2. ***Triple-conversion***
3. ***TrunkTracking***
4. ***Tone-encoding (PL/DPL)***
5. ***Alpha-numeric display***
6. ***Computer-control for cloning, programming, and Scout interface.***
7. ***VFO tuning***
8. ***500 channels (1,000 is nice, sure, but how many people use all those channels?)***
9. ***Multiple search banks***
10. ***Alkaline or NiCd battery capable***
11. ***AM/NFM/WFM (SSB is nice, but not a must, especially if frequencies below 25 MHz are not included. The user's ability to change modes from the default modes is handy, but not of utmost importance.)***
12. ***Frequency coverage of 25 MHz to 956 MHz (less cellular) at a minimum (There is really very little above 956 MHz that is readable, particularly on a portable. 500 KHz to 25 MHz is great, but how many of us really use it? Please write in and let us know if you monitor HF on your portable. This editor does enjoy the ability to monitor AM radio on a scanner.)***
13. ***Compact size (The ICOM R-10 appears to have a reasonable size. No portable should be any larger than an AOR AR-8000 or a BC-220/230/235.)***

Next month we may return with more reader letters and e-mail which tell of your most desired scanner features. Thanks for indulging me this month.

■ Heavenly Scanning

Bruce Ames (former RCMA aircraft editor, and the on-line aircraft editor for the SCAN-L list server), and Fred McGowan (former RCMA associate editor for Nevada) were kind enough to provide us with the frequencies that were in use during the USAF-50 show at Nellis Air Force base in Nevada during the last weekend of April. Since this month's feature article on Area 51 includes many Nellis frequencies as well, I have only included those frequencies these two monitors marked as active during the show.

Nellis AFB

Security:	163.4875S C-1 Primary Main Base Activity
	163.5875S C-2 Secondary Main Base Activity
	163.3750R C-3 Area II (To East - Weapons Storage)
Fire:	173.5875S C-1 Primary Activities
	173.8375S C-2 Secondary Activities
Voice Paging	150.2000R
Transportation Net	150.3000R
Commander Line	173.5375R (was using "Battle Staff" during AF50)
Medical Net	173.5625R
Communications Sqdn.	173.1500R
T-Bird Air Show Ops.	141.8500 & 138.7500 (AM Mode)

Emergency Nets By Net Name

Las Vegas TCA	124.95, 279.7
Nellis Control	126.65

Nellis AFB (KLSV) Airfield Frequencies

ATIS	270.1
Ground	121.8, 275.8
Tower	126.2, 132.55, 324.3
Approach	124.95, 279.7
Departure	279.9
Clearance	120.9
Command Post	320.0
Class B (N)	124.95, 279.7
Dispatcher	372.2
Supervisor of Flying	303.2
Airboss Discrete	340.8, 352.95
Airboss	384.9 (Golden Nugget)
Airshow Coord.	148.175 (Airshow 3 & 4)
Air Force Security Svc.	138.075, 138.175
Various Users	151.625, 173.5625, 135.1, 119.5, 352.8, 275.8, 148.525, 149.825, 148.250, 148.525, 150.3, 148.7

Demonstration Team Frequencies

USAF Thunderbirds Ops/Support	148.175
USAF Thunderbirds Diamond	138.75
Chilean "Halcones"	133.1
Brazil Team	126.4

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Computer Interface: RS-232C
Conversion Scheme: Double up-conversion
Sensitivity: 0.3 uv
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IF Selectivity: (-6/-60 dB) 4/10 kHz wide, 2/6 kHz narrow
Image Rejection -70dB
Selectable AGC: Off/fast/slow
Dynamic Range: 100 dB
Noise Blanker/Limiter: Adjustable
Tone Control: Yes
Antenna Connector: SO-239 and 600 ohm
Dimensions: 10"W/4"H/9"D
Weight: 7.7 lbs.
Power Requirements: 12 VDC/120 VAC
Warranty: One year
Accessories Included: AC adaptor

Larry Van Horn, N5FPW
steditor@grove.net

Monitoring the HF Aeronautical Bands

So you say you're tired of listening to the same old thing on your local 122.8 MHz unicom frequency?You've had your fill of flight following traffic from your local Flight Service Station on 122.0 or ACARS data transmissions on 131.550 MHz? Then it's time for a change! Let's dust off that shortwave radio sitting in the corner and see what some of the civilian HF aircraft frequencies have to offer you.

One of my favorite places to monitor in the HF utility spectrum is the aeronautical routed frequencies. You can hear both civilian and military air traffic traveling over the world's oceans and large land masses. Imagine sitting in your easy chair and hearing aero traffic from all over the world fill the speaker of your shortwave with air traffic control chatter just like you would hear on your VHF scanner. Or maybe you want to listen to the current weather conditions in other cities around the world. You will find that and much more on the aeronautical routed channels.

Where are these magical frequencies located in the HF spectrum? Here is a quick guide to the ranges you should be searching. Keep that radio in the upper sideband (USB) mode, since that is the mode mandated by international agreement. If you hear any other mode in the frequency ranges listed below, you are probably not listening to a legitimate aeronautical station. (There are a few exceptions to this rule, but USB will work just fine in all cases.)

2850-3025 kHz	5480-5680	13260-13360
3400-3500	6525-6685	17990-17970
4650-4700	8815-8965	21924-22000
	11275-11400	

MWARA

For the purpose of air traffic control (ATC) communications, the world has been divided into specific regions. These Major World Air Route Area (MWARA) frequencies have the same use as the ATC frequencies (specifically, FAA center assignments) on your scanner radio.

Because of the vast areas mentioned in the list presented in Table 1 of our Hot 240 Aero List, several of the MWARAs have been further subdivided into smaller segments. For example, the North Atlantic (NAT) MWARA is dvided into six separate segments: NAT-A through NAT-F. Each segment has its own assigned air space, frequencies, and ground stations. Sometimes a particular ground station, such as Gander, New York, etc, in the NAT family will be found on more than one segment, depending on its location.

These MWARA frequencies are used to keep commercial and military aircraft on conflict-free, fuel efficient routes during their flights. All aircraft flying in international airspace follow established routes (airways) with waypoint reporting positions. Waypoints are sometimes designated by five-letter name or geographic coordinates of latitude and longitude. As these aircraft pass each waypoint on their route, the pilots report current position to a ground station that has the "guard" for that aircraft. Usually, estimates for the next two or three

waypoints as well as flight level, wind direction/speed, outside air temperature, and fuel comsumption are given.

Only the MWARA family of frequencies are presented in our list in Table 1. A complete breakdown of each MWARA family would be outside the scope of this column. If you want more detailed breakdown and have an internet connection, you should visit the Utility World online web site at: **http://www.grove.net/~larry/**. You can also consult the 8th edition of the *Grove Shortwave Directory* if you do not have access to the internet.

LDOC Frequencies

The International Telecommunications Union (ITU) has authorized some frequencies for company ground-to-air communications. These frequencies are often shared by more than one international carrier and some carriers even provide services for other air carriers on these frequencies.

Traffic typically consists of arrival/departure information, passenger/fuel loads, flight progress reports, aircraft maintenance problems, and crew scheduling.

The vast majority of the traffic you will hear on long distance operational control (LDOC) frequencies is in English (the same applies to MWARA frequencies). Some airlines do communicate in their native languages on company channels. These broadcasts can be far more interesting than the routine traffic monitored on MWARA air traffic control channels. The list in Table 2 represents some of the more active LDOC channels in use in the HF spectrum.

VOLMET Stations

These transmit-only facilities broadcast meteorological information for aircraft inflight for specific parts of the world and are scheduled at designated times after the top of each hour, normally twice per hour. Usually several stations share the same frequencies. We have included the frequencies for the Atlantic and Pacific Volmet networks in our list in Table 2.

■ Flight Test Frequencies

Since communication is a vital part of the aerospace industry, adequate radio contact is necessary during many phases of aircraft development. A special station category was established along with assigned frequencies for the purpose of flight testing. These stations are resticted to the transmission of necessary information or instruction related directly to the test of aircraft and components of aircraft systems.

These unique frequencies (Table 2) received quite a bit of publicity several years ago with the around-the-world flight of the *Voyager* aircraft. During that particular event, extensive use of flight test frequencies was made by the *Voyager* aircrew.

Finally Table 2 has many other interesting routed aeronautical frequencies/services. You will find the NOAA Hurricane Hunter aircraft, US Customs, the DEA, ARINC, and emergency channels — just part of our "UW Hot 240."

So let's dust off that shortwave radio and check out some of the international action that can be heard in civilian aero spectrum of the *Utility World.*

■ Russian Navy.... confirmation at last!

Ary Boender in the Netherlands has reported several times in this column about the Russian navy stations with their characteristic single-letter channel markers. Lots of people, however, still do not believe that these are really Russian naval stations. Until a few weeks ago, the only evidence we had were the messages that we copied on the channel marker frequencies.

Now hard evidence exists that these stations really are naval stations! A Russian naval radio operator confirmed that theory to Ary, in person. He identified 'L' as St.Petersburg, 'P' as Kaliningrad, 'S' as Arkhangelsk, and 'C' as Moscow. He knew that other stations existed.

At the moment the following stations are still active:

Channel marker 'F' Vladivostok
Channel marker 'C' Moscow
Channel marker 'L' St.Petersburg
Channel marker 'P' Kaliningrad
Channel marker 'R' Ustinov
Channel marker 'S' Arkhangelsk
Channel marker 'V' Tashkent

A complete report on these stations (including frequencies) will be run in a future edition of the *Utility World* column.

Photo by Harry Baughn

TABLE 1: Major World Air Route Areas

Africa (AFI):	2851, 3419, 3419, 3425, 3467, 4657, 5493, 5652, 5658, 6559, 6574, 6673, 8894, 8903, 11300, 11330, 13273, 13288, 13294, 17961
Caribbean (CAR):	2887, 3455, 5520, 5550, 6577, 6586, 8846, 8918, 11387, 11396, 13297, 17907
Central East Pacific (CEP):	2869, 3413, 4657, 5547, 5574, 6673, 8843, 10057, 11282, 13300, 17904
Central West Pacific (CWP):	2998, 3455, 4666, 5652, 5661, 6532, 6562, 8903, 10081, 11384, 13300, 17904
East Asia (EA):	3016, 3485, 3491, 5655, 5670, 6571, 8897, 10042, 11396, 13297, 13303, 13309, 17907
Europe (EUR):	3479, 5661, 6598, 10084, 13288, 17961
Indian Ocean (INO):	3476, 5634, 8879, 13306, 17961
Middle East (MID):	2944, 2992, 3467, 3473, 4669, 5658, 5667, 6625, 6631, 8918, 8951, 10018, 11375, 13288, 13312, 17961
North Atlantic (NAT):	2872, 2899, 2962, 2971, 3016, 3476, 4675, 5596, 5616, 5649, 6622, 6628, 8825, 8831, 8864, 8879, 8891, 8906, 11279, 11309, 11336, 13291, 13306, 17946
North Central Asia (NCA):	3004, 3019, 4678, 5628, 5646, 5664, 6592, 10096, 13303, 13315, 17958
North Pacific (NP):	2932, 5628, 5643, 6655, 6661, 10048, 11330, 13300, 17904
South Atlantic (SAT):	2854, 2935, 3452, 5565, 6535, 8861, 11291, 13315, 13357, 17955
South America (SAM):	2944, 3479, 4669, 5526, 6649, 8855, 10024, 10096, 11360, 13297, 17907
South East Asia (SEA):	3470, 3485, 5649, 5655, 6556, 8942, 10066, 11396, 13309, 13318, 17907
South Pacific (SP):	3467, 5559, 8867, 10084, 11327, 13300, 17904

TABLE 2: Miscellaneous Listings

Alaska emergency statewide:	5167.5
Alaska Aviation Radio KWO3-Anchorage, AK:	17910
ARINC ramp checks:	5574 (Chicago, Minneapolis, Tulsa, Dallas-Ft Worth)
ARINC enroute:	KEA5-New York, NY 13345 KMA7-San Francisco, CA 6601, 8849, 13261, 13273, 13354, 17940 KUA3-Honolulu, HI 8915, 13261, 13273, 13339, 13354
Civil Air Patrol:	2371, 2374, 4466, 4469, 4509, 4582, 4585, 4601, 4604, 4627, 4630, 26618.5, 26620, 26621.5
Custom/U.S. Coast Guard:	3428, 5571, 8912, 11288, 13312, 17952
Department of Energy aircraft:	3422, 6535, 8912, 10045, 11288, 13312, 17901
Distress and Safety (ships/coastal stations):	4125
Domestic (Alaska):	2866
Domestic HF:	2875, 2911, 2956, 3449, 3470, 5427, 5490, 5496, 5631, 6580, 6604, 8855, 8876, 10066, 11357, 11363
Federal Avaition Administration flight test/check:	3428, 5571, 8912, 11288, 13312, 17952, 17964
Flight test:	2851, 3004, 3281, 3443, 5451, 5469, 5571, 6550, 8822, 10045, 11288, 11306, 13312, 17964, 21931
International distress and calling:	2182
Long distance operational control (LDOC):	3013, 3494, 5529, 5538, 6637, 6640, 8933, 10033, 10075, 11342, 11348, 13330, 13348, 17925, 21964
NOAA/National Marine Fisheries aircraft:	3407, 3416, 5562, 5610, 6673, 6682, 8876, 8882, 10015, 10093, 13267, 17901
NOAA Hurricane Hunters to KJY74-Miami:	3407, 5562, 5610, 6673, 8876, 10015, 13267, 17901
North Atlantic Volmet Islip, NY:	3485, 6604, 10051, 13270
Offshore drilling aircraft op.:	2878, 3019, 3434, 4672, 5463, 5506
Pacific Volmet KVM70-Honolulu, HI:	2863, 6679, 8828, 13282
Search and rescue communications:	3023, 5680, 8364

Utility Loggings

UTILITY WORLD

Larry Van Horn

Abbreviations used in this column

AFB	Air Force Base
AM	Amplitude Modulation
ANDVT	Advanced Narrowband Digital Voice Terminal
CW	Continuous Wave (Morse code)
DGPS	Differential Global Positioning System
DSN	Defense Switch Network
ETA	Estimated Time of Arrival
ETB	Estimated Time to Base
LSB	Lower Sideband
MAP	Maghreb Arabe Presse
NAS	Naval Air Station
NAVTEX	Navigational and meteorological warnings and urgent information for ships (SITOR-B mode)
QRM	Interference
PAP	Polska Agencja Prasowa
RAF	Royal Air Force
RTTY	Radioteletype
SAM	Special Air Mission
Selcal	Selective Calling
SITOR-B	Simplex teleprinting over radio, mode B
SWBC	Shortwave Broadcast
Unid	Unidentified
USB	Upper Sideband
USMC	U.S. Marine Corps
VIP	Very Important Person

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Time Universal)

123.7 DGPS station Mainflingen, Germany, with 300 baud MSK at 0841. (Boender-Netherlands)

447.5 LGQ-Rogaland Radio, Norway, with CW weather broadcast at 1335. (Ary Boender-The Netherlands)

518.0 UGE-Arkhangelsk Radio, Russia, with SITOR-B NAVTEX broadcast at 1600. (Boender-Netherlands)

2932.0 Tokyo Aero, Japan, working Japan Air 836 with position report and clearance request at 1437. (Gerald Brookman-Kenai, AK)

3413.0 Honolulu Aero, HI, working United 38 with a selcal check at 0843. (Brookman-AK)

4402.0 Bootleg fishing boats in a net at 0307. (Brookman-AK)

4721.0 Sidecar working Zulu 3 November and Zulu 7 November with "Alligator" comms. At 0153 Sidecar prepares the net for a 0200 operations change: Sidecar will change to, XAI. Changes for Z3N and Z7N are XAE and XAF at 0153. (Jeff Jones-San Francisco, CA)

4745.0 RAF Buchan, UK, working 1DN, 8NX, R1E during an exercise at 0805. (Boender-Netherlands)

4935.0 MRB01-RAF Cadets (Network B) working MRC16 at 1106. (Boender-Netherlands)

5150.0 Hardrock 11 Bravo working Advance 20 and many others (probably USMC) in a live-fire exercise involving aicraft and artillery at 0435. Leach Lake has been mentioned a few times. There is a Leach Lake in southern California, just south of Death Valley. The net is winding down now, but Hardrock and some others are going to be monitoring all night until the games begin again at "0900." A final note: 8056.0 was active with Hardrock September 1993. (Jones-CA)

5245.0 RAF Cadets stations—MRC01, MRH19, MRW98, MRC16, MRA01, MRW34 and MRO20 active with traffic at 1030. (Boender-Netherlands)

5547.0 San Francisco Aero, CA, working Air Canada 21, Eagle 11, YB205, United 44, and Sun Country 3 (moved to 5574) at various times around 0304-0410. (Gordon Levine-Anaheim, CA)

5598.0 New York Aero, NY, working Cubana 44, Gander Aero, NF, Condor 154, Delta 140, El Al 175, and Laker 614 between 0247-0419. (Levine-CA)

5628.0 Honolulu Aero, HI, working Eastern 538 with a position report at 1442. (Brookman-AK) Honolulu Aero, HI, working Singapore 12 at 1410. (Levine-CA)

5673.0 Beijing, China, VOLMET with aviation weather in Chinese at 1521. (Brookman-AK)

5680.0 Ronne Rescue, Norway, working Kinloss Rescue for a radio check at 0835. Architect (RAF UK) testing at 0848. (Boender-Netherlands)

5696.0 0215z 6001 working Camslant Chesapeake at 0215 and very weak my location. Was enroute to Zulu 6 with 2.3 hours fuel, 7 pax, Camslant Chesapeake advised frequencies of 5696 primary and 8983 secondary. (Brad Clark-Lewiston, Idaho, via e-mail)

5700.4 Magic Carpet Sierra working Oscar 3 Mike regarding their "black box" at 2357. (Jones-CA)

5800.0 Lifelong tries Nightwatch, no joy (heavy SWBC QRM) at 0257. (Clark-ID)

6090.0 English female numbers station in AM at 1414. (Bob Pemerey-Toledo, OH) At 1750 with same type traffic. (Paul Stickney-Gilford, NH)

6683.0 SAM 375 shutting down comms with Andrews VIP for the night at 0130. SAM 206 working Andrews VIP with phone patch to SAM Command at 1803. (Jones-CA)

6709.0 Japanese fishing fleet comms at 0440. Reminds me of the 6959 "off the coast of British Colombia" fisheries net, only in Japanese. (Clark-ID)

6713.5 Moffett Rescue coordinating operations with King 83, Jolly 07, and Jolly 15 at 0330. (Jones-CA)

6730.0 Casey 01 (DV-2 + 17), departed Moffett at 0022, enroute Offutt, ETA 0332, working Andrews VIP for an often heard (shortly after take-off) series of message relays/phone patches: first a message relay to the NMCC followed by their usual phone patch to Raymond 21 and then another request for a message relay to Look 01 (and sometimes Look 02). Also mentioned diverting to Tinker if need be due to bad weather at 0027. (Jones-CA)

6731.0 Japanese inter-boat comms at 0433. Private/unauthorized frequency? (Clark-ID) *Probably unauthorized pirates in the OR segment-Larry.*

6752.0 Sidecar calling Hotel 1 Victor in LSB advising they were XO with their unit at 2115. (Sue Wilden-Indianapolis, IN)

6761.0 SAM 26000 working Andrews VIP for phone patches regarding troubleshooting possible bad flight data acquisition unit in connection with another failed unit. Mentioned getting a new unit to Moscow if needed. It now sounds like they've decided to abort the mission and return to Andrews AFB at 2350. (Jones-CA)

6800.0 Bootleg fishing boats in a net at 0307. (Brookman-AK)

6825.0 FAV22-French Air Force at 0925 station in CW at 0925. (Boender-Netherlands)

6830.0 SPAR 65 working Andrews VIP for message relay to SAM Command at 0236: "...in the blocks at 0240." (Jones-CA)

6836.4 Bishop working unid for a signal check at 1637. (Jones-CA)

6855.0 KKN50-U.S. Department of State Radio, Warrenton, VA, (a blast from the past for me!!) heard with 5-figure cut groups using CW at 0500. Still going strong late into the night. (Clark-ID)

6871.0 HEB7-Unid station with V CW marker at 2224. (Dix-NY)

6925.5 KKN50-U.S. Department of State Radio, Warrenton, VA, with QRA CW marker at 2229. (Dix-NY)

6991.0 Unid station with "go ahead with weather report" at 2347. (Wilden-IN)

6992.5 Royal Navy Sea Cadet stations—MFP34, MFQ40C, MFJ04, and MFP29 with traffic at 1010. (Boender-Netherlands)

6993.0 Nightwatch 01 checking Andrews VIP here for possible HF circuit at 2116. (Jones-CA)

6994.0 Air Force 2 working Andrews at 0212. (Jeff Nicklaw-Asheville, NC)

7632.0 Foster working unid with computer troubleshooting/setup comms at 1620. (Jones-CA)

7831.0 Lifelong and Nightwatch hook up, Lifelong reports "heavy background music on Z150," then 3-character authentication process "AKJ with Echo" and BQZ." Nightwatch assigns Z710 as primary and Z125 as secondary (4495), changed freqs to Z125 for comm check at 0300. (Clark-ID)

7975.0 Crown 01 working Camelot and Jolly 31 regarding search in progress at 2345. (Jones-CA)

8026.0 SAM 300 working Andrews VIP at 0235. Nightwatch 01 working Andrews for crypto circuit at 2118. SAM 375 (DV-2 + 6), working Andrews VIP for phone patch to SAM Command regarding revised ETB at 2002. Venus 26 working Andrews VIP with phone patches regarding 2335 ETA at Andrews AFB at 2236. PACOM 01 (DV-2 + 17), enroute NAS Miramar, working Andrews VIP for phone patch to Hilda West and SPAR 19 shutting down comms. Both around 0108. (Jones-CA)

8047.0 SPAR 64 (DV-2), departed Andrews around 0200, working Andrews VIP for phone patch to Andrews meteo for weather at Gander, ETA

0415, and Goose Bay, ETA 0445. Also heard on 4742.0 and 5398.0 at 0230. (Jones-CA)

8057.4 N9 trying to raise unid. No joy at 1738. (Jones-CA)

8190.0 Spanish female numbers station in AM at 0218. (Steve Clark-Pampa, TX)

8300.0 New Star Broadcasting Station, Taiwan, with Chinese number broadcast at 1510. (Boender-Netherlands)

8442.0 TCR-Istanbul Radio, Turkey, with CQ CW marker at 0005. (Dix-NY)

8471.0 Simonstown Naval Radio, South Africa, with V CW marker at 2340. (Dix-NY)

8566.0 ZSJ-Comcen Capetown Naval Radio, South Africa, with V CW marker at 2323. (Dix-NY)

8606.0 ZRQ-Simonstown Naval Radio, South Africa, with V CW marker at 2328. (Dix-NY)

8694.0 XSZ-Dalian Radio, China, with CQ CW marker at 1122. (Dix-NY)

8843.0 Reach 602 (US Air Force transport) working Honolulu Aero, HI, at 0217. (Levine-CA)

8910.0 Spanish female 5-digit number station in AM at 0612. (Levine-CA)

8933.0 Speedbird 204 working Springbok Radio, Johannesburg, South Africa, aircraft requests that ARINC inform company that it cannot proceed to Montreal, but must stop at Gander instead at 0108 (ACARS data followed). (Ken Maltz-Syosset, NY)

9016.0 "860" working McClellan Global for phone patch to "Pony Ops" Rescue regarding search in progress near Phoenix AZ. A "Sheriff" helo, "195" and "196" are also involved at 0235. (Jones-CA)

9251.0 English female 5-digit number station in AM at 2211. (Dix-NY)

10075.0 Houston LDOC, TX, working N5732 (17250 and Delta 10 (2348). (Levine-CA)

10204.0 Nightwatch 01 checking Vagabond out of the net at 0120, but advised Vagabond to stay on frequency until landing. (Jones-CA)

10231.1 CNM78-MAP Rabat, Morocco, with news bulletins in French at 1621 using 50 baud RTTY. (Dix-NY)

10586.0 Trout 99, "over Winslow, AZ," working Andrews VIP for a phone patch regarding 0200 arrival at Kirtland AFB. SAM 203 is also on frequency at 0040. (Jones-CA)

10780.0 JSTARS-03 working Cape Radio for attempted phone patch to Brat (sounded like) from calling-party onboard, callsign "Wizard." Patch was aborted in favor of the "airphone" at 0017. (Jones-CA)

11053.0 SAM 26000 working Andrews VIP for phone patch to Delta Warrior (sounded like) at 0300. (Jones-CA)

11111.0 ANDVT communications noted here at 1917. (Clark-ID)

11145.0 Heard some unid spanish comms here at 2210, Mexican government? "...yo transmite Charlie Golf y recibe Echo Juliet, repite Echo Juliet..." Mentions of a "Boletina Circular" (Circular Bulletin), then into reading the message, with "seccion uno" and "seccion dos" et al. Could not get any place names or IDs, just too weak and fading in and out. Accents were Mexican, not Cuban... possibly Mexican military or a daytime equivalent of 7730? (Clark-ID)

11155.0 RIT-Valgach Naval Radio, Russia, calling RKZ using CW at 1819. (Dix-NY)

11175.0 Air Force 1 here for a radio check, no response at 1304. (Mike Smith-Houston, TX via e-mail) Orca 34 working Offutt GHFS at 1634. (Levine-CA) Viking 52 calling McClellan at 1718 with phone patch to Minneapolis Air Reserve (DSN 783-1727). Pilot sounded like a commercial pilot, complete with the "uhhhh" that commercial pilots use and we joke about. (Clark-ID)

11181.0 Roadmap calling McClellan at 2154, advising they have already picked up their traffic, and are ready to send theirs. Nothing further. (Clark-ID)

11183.0 Xray 27 working unid station, heard saying "Let's go . . . (lost in fade)", then ANDVT comms. Xray 27 weak readable here, his buddy was not heard at 1714. (Clark-ID)

11214.0 F1J working B1B at 1945, confirming tracks in the playground. F1J is overmod and echoes badly. At 1950, same stations come back up, only as Titan (F1J) and Neptune (B1B). Titan requests Neptune to contact Razorback and have him come up on this voice frequency. Neptune advises that Razorback can monitor two separate playgrounds, but does not wish to do so at this time without link parameters. Titan then gets very slow and deliberate stating "imperative that Razorback come up on this voice net, understand, interrogative?" Neptune confirms, then mentions 6G1. Next callup, back to trigraphs, with nothing hrd from Razorback. (Clark-ID)

11220.0 SPAR 19 (near Kansas City) working Andrews VIP at 2333. PACAF 01, enroute Eglin AFB, ETA 0045, working Andrews VIP for phone patches at 2330. (Jones-CA)

11232.0 Unid aircraft, selcal GHBD working Hamilton Mobile for signal check at 2004. Transmitter 1 was loud and clear, but would not receive selcal. Transmitter 2 was loud and distorted, but would open up on selcal. Hamilton queried for another freq and aircraft location. Aircraft was north of Edmonton. Hamilton suggested 9007, but RTTY interference made further intercept impossible here. (Clark-ID)

11416.0 Unid station with very clean 5-digit groups CW. Ended traffic with 3x BT, then a call up for '486' three times, then fades to noise. Definitely machine or keyer sent, speed, and pace consistent with a keyer and a good 'Bencher fist' at 1717. (Clark-ID)

11460.0 Andrews and Spar 64 in comms with phone patch to Ramstein at 1922. (Clark-ID)

11460.0 SAM 974, ETA home station 1210, working Andrews VIP for a "morale" phone patch and periodic signal checks at 2324. Casey 01 working Andrews VIP for phone patch into NMCC callsign, "Ringmaster" regarding mission status at 0442. SAM 375 (DV-2 + 6), working Andrews VIP for phone patch into Buckley Operations at 1705. Navy 496, departed KNGU 0100, ETA EGPH at 0915, working Andrews VIP with periodic signal checks at 0117. (Jones-CA)

12677.0 HMZ-Pyongyang Radio, North Korea, with CQ CW marker at 1305. (Dix-NY)

12710.0 XSZ-Dalian Radio, China, with CQ CW marker at 1126. (Dix-NY)

12715.0 PKN-Balikpapan Radio, Indonesia, with CQ CW marker at 1216. (Dix-NY)

12724.0 9VG57-Singapore Radio with CW CQ marker at 1156. (Dix-NY)

12730.0 UHS-Murmansk radio, Russia, with CQ CW marker at 1202. (Dix-NY)

12923.0 HLW2-Seoul Radio, South Korea, with CW CQ marker at 1156. (Dix-NY)

12947.0 ZRH-Capetown Naval Radio, South Africa, with DE CW marker at 1304. (Dix-NY)

13020.0 VRX60-Victoria Harbor Radio, Hong Kong, with CQ CW marker at 1259. (Dix-NY)

13273.0 Honolulu Aero, HI, working Cathay 880 with a position report at 2256. (Brookman-AK) Honolulu Aero, HI, working Northwest 69, Japan Air 610, and Singapore 11 between 0111-0322. (Levine-CA)

13282.0 Honolulu VOLMET, HI, with English aviation weather at 0032. (Brookman-AK)

13288.0 Honolulu Aero, HI, working Continental 75 with a position report at 2255. (Brookman-AK)

13348.0 CWC 91 calling Cedar Rapids, IA, no answer at 0148. (Levine-CA)

13440.0 SAM 204 working Andrews VIP with phone patch requests at 0120. PACAF 01 working Andrews VIP for a phone patch request and signal checks here and on 6730.0 at 0340. Casey 01, on the ground at Yokota AFB, setting up comms with Andrews VIP at 0208. (Jones-CA)

13585.0 CNM78-MAP Rabat, Morocco, with news bulletins in French at 1621 using 50 baud RTTY. (Dix-NY)

14395.0 MARS net with various stations checking in at 1639 such as NNN0EGY and AAA6UQA. (Wilden-IN)

14487.0 English female 5-digit number stations in AM at 1744. (Brookman-AK)

15011.0 Lightning Base working Lightning Mobile (USMC self-IDed) regarding radio problem: "high pitched whine." Base told Mobile to try turning off the engine. They tried it, no luck at 0235. (Jones-CA)

15034.0 Canadian Forces military VOLMET, Trenton, ON, with aviation weather at 1720. (Brookman-AK)

15687.0 Casey 01 checking Andrews VIP here for possible new primary at 0417. (Jones-CA)

15962.0 Nightwatch 01 working Armament on Z-250 for a brief signal check at 1958. (Jones-CA)

17191.0 LSA-Boca Radio, Argentina, with V CW marker at 1926. (Dix-NY)

17457.0 Lightning Base working Lightning Mobile (USMC self-IDed) for a radio check at 0347. (Jones-CA)

18220.9 CNM78-MAP Rabat, Morocco, with news bulletins in French at 1621 using 50 baud RTTY. (Dix-NY)

18265.0 CNM78-MAP Rabat, Morocco, with news bulletins in French at 1621 using 50 baud RTTY. (Dix-NY)

18648.5 SOT265B-PAP Warsaw, Poland, with SITOR-B Polish news bulletins at 1413. (Dix-NY)

Shortwave Broadcasting

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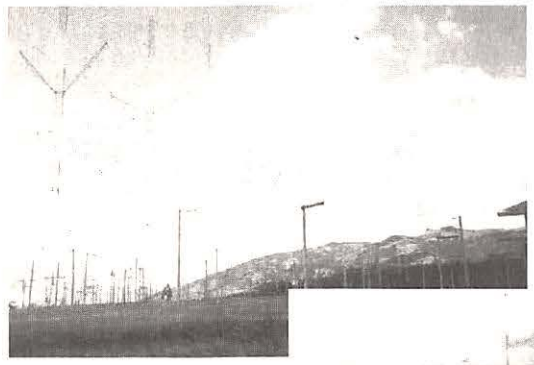
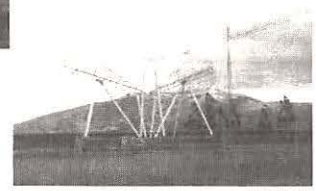
HCJB Must Move Out Of Pifo

A long-delayed Ecuadorian government project to build a new airport for Quito is now taking shape. It's near Pifo with a runway aimed right at HCJB's highest antenna tower, so HCJB has been ordered to dismantle its entire shortwave transmitter site covering 110 acres with 11 transmitters totalling over 1000 kW, 32 antenna systems, 48 towers ranging from 30 to 417 feet high. Glen Volkhardt, Asst. Dir. for Latin America, was interviewed about this on *DX Partyline*. Construction is to begin in 1998, and it should take HCJB about the same amount of time to move out as it takes to build the new airport.

This forces HCJB to re-evaluate its options. Regional broadcasts to Ecuador and neighboring countries could be carried out only from somewhere else in Ecuador, but HCJB may speed up negotiations already underway to use SW relays in Europe, and will not attempt to reach Europe and Asia from Ecuador. A new site in South America is likely for that continent, and rental arrangements to reach North America were being investigated. HCJB is also awaiting word on whether it will get control of an existing SW site in Africa, not Zambia, and there have been previous reports about the possibility of broadcasting from Australia. It is hoped that the government will help with the dismantling expenses. HCJB may well get into new media other than SW to reach its audiences.





Ed Newbury

ALASKA Fred Osterman of Universal Radio is one of four new expert commentators on KNLS, reviewing new receivers, SWL publications, DX gadgets, 0800 on 9615, 1300 on 7365 (via Edwin Southwell, World DX Club *Contact*)

ANTARCTICA LRA36, 15476, official schedule is *1900-2100*, includes IDs in English, French at odd times; gives coordinates, requests return postage to this address: LRA36, 9411 Esperanza Station, Tierra del Fuego, Antártida e Islas del Atlántico Sur, Argentina. Planned increase to 3 kW soon (Gabriel Iván Barrera, *BC-DX*) Announcer is Mrs. Adriana Figueroa (Barrera, *EDXP* via *The Four Winds*) Opening and closing theme is *Así es mi Argentina* (Barrera, RN *Radio-Enlace*) Actually 100-200 Hz on low side of 15476, not AM but USB + suppressed carrier (David M. Clark, *DX Ontario*) *Suppressed means there is no carrier detectable: I assume you and others actually mean "reduced" - gh.* One day at 1905 it was on 15472, adjusted at 1929 to 15476 (Horacio Nigro, Uruguay, DSWCI *DX Window*)

ARGENTINA Replacing Julio Marbiz Jan. 1 as national directress of Servicio Oficial de Radiodifusión was Mrs. Patricia Ivone Barral, at LRA-1 (Gabriel Iván Barrera, *Radio Nuevo Mundo*)

ISB feeders moved down to 8098: R. del Plata FM on USB at 0700-0728, then I switched to LSB and listened to R. Rivadavia until 0800 news flash and fade; another day 1005-1030 fade (Takayuki Inoue Nozaki, *Relámpago DX Logging*)

[non?] R. Cochiguaz, pirate heard on a UT Sunday at 0032 on 6925.6, Andean and pop music, USA and Argentine addresses (Gabriel Iván Barrera, Argentina, *OzDX*)

AUSTRALIA ABC managing director Brian Johns says RA will continue as a mainstream broadcaster despite a federal funding cut of AS42M (RA via BBCM) Derek White, G.M. of RA took early retirement after 5 years at the station, many more at ABC; said there was no future for his position (Jane Freeman, *Signpost* via Mike Cooper) More than half the staff, 80 people, lose their jobs under the new budget.

On *Feedback*, Terry Brown, Asst. G.M. said English would be cut from 24 to 18 hpd, but apparently this meant RA productions; might fill out the remaining 6 hrs with ABC simulcast (gh) Darwin will no longer be used for RA shortwave, and NTA will explore possible future uses of the Cox Peninsula site (Matt Francis, *Electronic DX Press*)

Contrary to their own website, RA is using 17860 at 0030-0200; it's the same transmitter as from 0200 on 13755, 0400 on 11880, 0630 on 9580, 1300 on 5995, 1700 on 11880, 2130 on 17860 (via Bill Westenhaver)

BELGIUM A new law makes BRTN an autonomous company and renames it VRT with vast restructuring (RVI *Radio World*)

BOLIVIA R. Frontera, 4449.97 at 0120 had gorgeous music, harmony female vocals, syncopated guitar and percussion, well-modulated, room-filling audio at peaks; 0155 canned ID with echo (Jay Novello, NC)

R. TV Colonia, 6556.98, Yapacani, reactivated, 0005-0155+ with all religion, bad modulation but strong carrier (Jerry Berg, MA, *NU* via *Electronic DX Press*)

CANADA CFCX 6005 had been missing for some time when I contacted the CIQC chief engineer. He didn't know it was off, but would have the consulting engineer look into it. Listeners should send the CE a message that CFCX has a following; it's obviously not a priority in their minds. I would hate to see this old-timer become history (Peter George, MA, *rec.radio.shortwave* via George Thurman)

QSL letter from CHNX, 6130, Halifax, for April 13 reception at 2131 confirmed they were still only 50 watts, a Harris solid state exciter that will eventually feed a 1 kW Harris transmitter, says Wayne Harvey, C.E. (Kent Mueller, NJ) *Best to try in the daytime if you're not too far from the Atlantic Northeast (gh)*

CABC, Canadian-Asian Broadcasting Corp. in Toronto, expects to be granted 1670 kHz as early as July, headed by Sri Lankan musician resident in Canada George Konezsh; also wants to reach Tamils in Europe, N. America via SW (Jeff Cohen, World Radio Network, *W.O.R.*)

CHILE The station reported last month as R. Llanquihue, 2nd harmonic on 3180.7, now IDs as Emisora Tepual, Puerto Montt (Horacio Nigro, Uruguay, DSWCI *DX Window*) Heard at 0100-0300, 1230 on 3180.85, 2 x 1590 (Hugo López, Chile, *hard-core-dx*)

COLOMBIA R. Patria Libre, clandestine, reactivated on May Day, and subsequently heard daily 2200-2230 on 6250 (Henrik Klemetz, *Dateline Bogotá* via DSWCI *DXW*)

CONGO Brazzaville back on 4765, 5985, around 1730-2130 with smart marches, ardent speeches (Matthias Gatzke, Germany, *BC-DX*)

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel program-ming; + = continuing but not monitored; 2 x freq = 2nd harmonic; J-97=May-Sept; Z-97=Summer season; W-97=Winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there.

CONGO D.R. Reminder to check 15244.5 for possible broadcasts from the new government, ex-Zaïre (gh) Already on April 23, the Bukavu station held by rebels was renamed Congolese Radio-TV (BBCM)

COSTA RICA RFPI is now offering 10th Anniversary QSL card. Although location announced is Ciudad Colón, postal address is P.O. Box 88, Santa Ana—actual location given on card is El Rodeo (gh) *Continent of Media* planned to be on hiatus for the summer, maybe back in Sept or Oct (gh)

R. Casino, 5953.6, is heard best Sunday morning and evening when the channel seems less noisy, but late sign-on of 1100 and early sign-off by 0030 (Henrik Klemetz, Colombia, DSWCI *DX Window*)

Bill Matthews has started doing a monthly DX report on TIAWR *Wavescan*, around 1100 and 2300 Sundays on 5030, 6150, 7375, 9725, 13750, 15460 (gh)

CUBA RHC unexpectedly shifted time of English hours in May to 2030-2130 on 13715, 13725-USB; and 2230-2330 on 6000 (gh) To make it easier to remember the times, RHC's *DXers Unlimited* on Sats/UT Suns shifted an hour to be at same times as Tue/UT Wed programs, a little past: 2100 on 13715 (41°), 13725-SSB (37°); 2205 [*sic*, means 2305] on 6000 (not 10°); 0130, 0330 on 6000 (10°), 9820 (348°), 9830-SSB (37°); 0530 on 9820 (315°), 9830-SSB (37°) (Arnie Coro, RHC, *rec.radio.shortwave* via *Electronic DX Press*)

R. Rebelde, 5025 has audio problems, and sometimes misses Saturday nights; usually runs all night until 1030 or 1100 (Maryanne Kehoe, GA)

GEORGIA "KVOH" tested new service to India at 1400-1600 on 12120 (Bob German, GJA)

GERMANY DW inaugurated new SW station in Nauen, near Berlin, April 25, costing DM70M, expanded by four new 500 kW, replacing nine 100 kW at Jülich, while four new 500 kW have been rented at Wertachtal, for a net increase of power from 7000 to 8600 kW. Nauen will operate 36 hours a day via ultra-modern antenna array, and is testing digital broadcasts (DW via BBCM) First broadcast was at 1200-1300 on 21550, simultaneous analog and digital. (Harald Kuhl, DSWCI *DX Window*)

DW will drop five European languages on Jan. 1: Dutch, Danish, Norwegian, Italian, French, saving DM7M, and allowing new Bosnian service (ADN via BBCM; Joe Karthaus) German service will cut from 8- to 4-hour cycles repeated, saving DM1M (R. Budapest DX)

SDR Stuttgart, and SWF Baden-Baden plan to merge on Jan 1, 1998, becoming the second largest public broadcaster. But this must be passed by parliaments in both states. Main radio program streams will be reduced from eight to six, and we hope the two 20 kW SW channels on 7265 and 6030 can both be preserved (Wolfgang Büschel, Germany)

HONDURAS La Voz de la Mosquitia, 4910.6, presumed, no ID; religious talk in Spanish at 0032 with transmitter breaks (Hans Johnson, TX, *Cumbre DX*)

HRMI, 5890, sent newsletter saying this is the first of 100 MW & SW stations IMF World Missions plans to build around the world. It's an "apostolic church planting missions agency," P.O. Box 6321, San Bernardino, CA 92412; <jkpimf@msn.com> (Rich D'Angelo, Henry Lazarus, DSWCI *DX Window*)

INTERNATIONAL WATERS [non] *Electra* radioship project is believed by some to be vaporware, but Scott Becker was promoting it in May on a *Yesterday-USA* interview. If funding comes through, might sail by July 1 to a Caribbean island. Will relay *YUSA* on one transmitter 24h from Galaxy-5 feed. Two other transmitters will use a total of 6 frequencies, one day and one night for each (via Tom Dimeo, *Continent of Media*)

IRAN [non] Opposition stations as monitored April 7: V. of the Iranian Revolution ending Kurdish at 1558 on 3875, 4375, both later relaying V. of the Iranian Communist Party, in Persian, jammed and varying. V. of Iranian Kordestan at 1430 on 3940. V. of Mojahed at 1900 in // on 3550, 3850, 4450, 4650, 5150, 5450, all jammed and constantly moving up to 20 kHz to avoid. V of the Worker at 1430 on 4190 (BBCM)

Democratic Voice of Iran is new clandestine, testing 5900 at 1730-1800 per Persian ads in a Paris newspaper (*World of Radio*)

ITALY RAI has Esperanto to Europe, Sat 2000-2020 on 9755, 7180 (BBCM)

KIRIBATI During enhanced Pacific conditions, R. Kiribati audible on 9810-USB with R. Australia news at 0600, local news at 0605-0615, ID (gh, OK)

KOREA NORTH R. Pyongyang heard on new 4405, Spanish feeder at 1215 // 6575, 9975, 11335 (Roland Schulze, Philippines, *BC-DX*)

KURDISTAN V. of Islam, V. of the Islamic Movement, heard in Kurdish at 1430-1600 on 6305, 4400, 4135, all variable, sometimes followed by Arabic until 1700, and unconfirmed Kurdish at 0200-0330 (BBCM)

R. of Kurdistan, V. of the Kurdistan Socialist Democratic Party was a new station heard testing between 1445 and 1700 on 4230v, in Arabic and Kurdish. Did not give location or schedule. It's one of five parties making up an alliance led by the PUK. Another new station in the same alliance is V. of Independence, R. of the Conservative Party of Kurdistan, 1500-1700 on 4190v (BBC Monitoring)

V. of the People of Kurdistan, PUK station, announced Arabic would be at 1700 on 4120, repeated at 0300 after Kurdish on 4120, and at 0900 on 6015 (BBCM) See also IRAN

V. of Iraqi Kurdistan homepage: **http://ourworld.compuserve.com/homepages/gara/** and E-mail to: <101564.3336@compuserve.com> (Nick Grace, *Cumbre DX* via *BC-DX*) Includes history of station, started in a cave, but must now be outside Iraq (Andy Sennitt, RN*MN*)

LIBYA Still tone-testing transmitters around 0730-0945 on 6155, 9655, 9705—strongest here, 11770; separately 0845-0900 on 15415 (Wolfgang Büschel, Germany)

LITHUANIA [non] R. Vilnius, English to us at 0030-0100 via Germany on new 9875 (Bob Thomas, Steven Cline) But also on synchronized //9855, so Germany too? (George Thurman, TX) also supposed to be on 9635 (*Panlview*, Bulgaria via *BC-DX*) *With access to two transmitters, more frequency diversity would be prudent (gh)*

MÉXICO Juan Mort, XERMX director, mentioned to me they were about to increase power, so I E-mailed him for more info. The reply came on *Mail Box*, Tue at 1500 on 9705 from host Alejandro Joseph: great efforts are being made to activate two more transmitters—10 kW in July on 11770, and 50 kW in August on 15430 with log-periodic (gh)

As of mid-May, XERTA, 4800 had not made any more tests due to economic problems and illness of the owner and manager, but hoped to be back on in two weeks; as did R. UNAM, which was repairing the fault which allowed it to be heard above 10 MHz (Julian Santiago and Hector García, *World of Radio*)

Status of rarely logged stations: off the air - 5980, 6045, 6090, 6105, 6115, 6165/9515/15160; on air very sporadically - 6020 La U de Veracruz; repairing equipment and soon back - 9545 La Jarocha; being repaired - 9600 R. UNAM (Juan Mort, XERMX, *Cumbre DX* via DSWCI *DX Window*)

MONACO TWR, English at 0710 on 9755, also on loud, clear spur 9744.8 (John Kecskes, Australia, DSWCI *DX Window*)

NEW ZEALAND RNZI printed sked shows additional repeat of *Mail Box* Mon at 1130 on 6100, now alternating with *City Talk* instead of *Travel Pacific* (via Gigi Lytle, TX) Both RNZI and KHBI started using 9845 at 2000, but KHBI shifted to 9355 (Adrian Sainsbury, RNZI *Mail Box*, Jim Moats)

As of June 29, Kiwi Radio will cease operations on SW, and become involved in legal FM broadcasting. From July 1, the SW transmitters will be taken over by R. Jemima, which will then relay Kiwi R. until its 20th anniversary around Sept. 6. Had been appearing Sundays at 0715 on 7475 USB (*Kiwi Radio News* via *hard-core dx*)

NICARAGUA Sr. Evaristo Mercado P., Director of R. Miskut writes that they were still awaiting the MW transmitter sent by John Freeman; it would take three more months (Tetsuya Hirahara, Japan, *Radio Nuevo Mundo*) *So by now their time on SW 5770 may be nearing an end (gh)*

NIGERIA V. of Nigeria finally resumed regular programming on 7255, including English 0500-0800, 1200-1400, 1900-2200, then another hour in vernacular until 2300* (Ed Rausch, NJ, *Cumbre DX*)

NORWAY NRK English changes on Sunday include: 1200 on 13805 to NAm, 13800 to FE; 2200 on 9965 to SAm (NRK)

PERÚ R. Cristal is a new station in Arequipa on 4050.6, heard at 1000 (Hugo López, Chile, *hard-core-dx*)

R. San Ignacio reactivated on new 6997.6, good and strong at 2300, "la voz de la peruanidad." In same town is R. Perú, reactivated on new 7032.0 ex-5926v after 2250, weaker than R. San Ignacio (Henrik Klemetz, *Dateline*

Bogotá via DSWCI *DX Window*) The 6261.1 station reported last month at 0100-0200+ had tropical and disco music, not one single ad; ID repeatedly as "JBL" or "JVL" and location as "Centro Comercial de Consuelo, distrito de San Pablo, provincia de Bellavista, departamento de San Martín" (Klemetz, *DXW*)

R. Chaski is a new Baptist station testing on 6090 from Paucartambo, to increase from 1 to 5 kW, but may have to move due to the Chilean missionary station on 6090, Peru's Nacional on 6095 (Rich McVicar, ME, *NU* via *RNM*)

R. Huancabamba on 6535.8 at 2255-0010*, nicknamed *la nueva alternativa* and *la positiva*. R. Huamarca [*sic*] on 5385.3 at 0020-0100 with show about potato farming (Pedro F. Arrunátegui, Lima)

R. Bambamarca, 4419.3 says they will soon put another station on the air, Estación Norte on 4300 (Henrik Klemetz, *Dateline Bogotá* via DSWCI *DX Window*)

POLAND R. Maryja reactivated on 6255, 1755-1959* in Polish with usual format including Vatican relay 1800-1820 but not //5882. Powerful 40 over 9 in Moscow, perhaps via European CIS site (Nikolay Pashkevich, *Cumbre DX* via *OzDX*) Tremendous signal on 6255 at 1900-2000, must be at least 100 kW, no ham transmitter now (Wolfgang Büschel, Germany)

RUSSIA On Radio Day, May 7, VOR head Armen Oganesyan called it a national treasure, whose budget was cut to 15% of what was expected, and that listeners should interfere and speak up for VOR (BBCM) Not beamed to us in the mornings, but main VOR frequency audible here at 1300-1700 is 15430 (Tom Sundstrom, Mark Fine, Ivan Grishin, Gigi Lytle) Careful: The current printed program schedule of VOR WS shows the times one hour off along the right margin for the second half of the UT day (via Sheldon Harvey, Gigi Lytle)

IBRA Radio in Arabic at 2000-2100 on 12015 and 12020 via Moscow, blocking HCJB 12015 after 1956 (Wolfgang Büschel, *BC-DX*)

V. of Assyrians, 7305, verified after 3 years with two R. Moscow cards filled in by Head Editor Marona Arsanis (David Foster, *OzDX*) R. Kala Aturaya, that is V. of the Assyrians, via Krasnodar 7325 from *1529 with a cappella songs, then Moscow in Arabic from 1800 (Koutamanis, Greece?, *Cumbre DX*) Sked 1530-1600 7325 Krasnodar, joining 9880 Moscow at 1500-1600, Sat only in Assyrian, Russian, English, Persian, Arabic. 7325 also carries Adygey Radio, Mon and Fri 1700-1800 in Adygey, Arabic, Turkish, and Kabardino-Balkar Radio, Wed and Sun 1730-1800 in Kabardin. *Special News for Polar Regions*, Mon only 1515-1545 on 9490 Samara to Antarctica (Nikolay Rudnev, Russia, *BC-DX*)

SAIPAN Best signals from R. Free Asia are via KHBI. Perhaps Monitoradio is hoping that RFA will buy the station or lease it through a third party (Victor Goonetilleke, Sri Lanka, *UADX* via *BC-DX*)

SÃO TOMÉ Contrary to expectations, another person at VOA relay is willing to QSL direct, Manuel Neves, transmitter plant technician, to previously published address (J. D. Stephens, *hard-core-dx)*

SERBIA Tanyug (press RTTY) announced it would halt SW broadcasts as of April 18 due to change of technology (BBCM)

SOUTH AFRICA World Music Radio is back, from May 31, every Saturday and Sunday 1800-2200 via SENTECH on 3345 100 kW to southern Africa, and 6290 (alt.: 6270) 250 kW beamed northwards and should be well heard as far as Europe. WMR will play the best current and past hits in a personal, informal and friendly style. Antenna tests were carried out earlier in May. QSL for reports with return postage to: WMR, P.O. Box 112, DK-8900 Randers, Denmark; full details at: **www.wmr.dk** (Stig Hartvig Nielsen, WMR) Test well heard here after 2130 on 6290 (Jay Novello, NC)

The Investment Channel ceased transmissions from Meyerton on May 12 at 2200 (Kathy Otto, SENTECH via Dave Kenny, BDXC) *Didn't pay bills? Out of business? Gone somewhere else? (gh)*

The news service at SABC, especially in Afrikaans, is in a sorry state, following the cancellation of a contract with the SAPA news agency upon which it relied (*Rapport* via BBCM)

SPAIN REE English supposed to be on 6125 to Europe, but heard only on 11775 to Africa, weekdays 2000-2100, weekends 2100-2200, but Saturday actually starts at 2105 (Eugene Gebruers, RVI *Radio World* via Steven Cline)

TAJIKISTAN R. Tajikistan, English at 0245-0300 weak and clear on new 11620 ex-9905 (Tony Jones, Paraguay, *Cumbre DX* via *BC-DX*)

IBC, International Broadcasting Corp. made up of former BBC Tamil employees, is starting own service to S. India, Sri Lanka; tested via Dushanbé 12070 in mid-May at 1330-1430; plans high-quality news service (Jeff Cohen, World Radio Network)

TIBET [non] V. of Tibet 1220-1257 on new 11570, then R. Free Asia in Tibetan from 1300 on 11575; winter frequencies were also close, 7400 and 7355 (Victor Goonetilleke, Sri Lanka, *UADX* via *BC-DX*) *Probably from same CIS site (gh)*

UKOGBANI R. Free London unattended transmitter near a motorway was discovered by authorities who at first thought it might be an IRA bomb, before the anticipated change to 5805 reported last month. RFL has at least seven backup transmitters which need a bit of work (RFL via Francis Mougenez, DSWCI *DX Window*)

UKRAINE R. Marabu had problems getting the programs to the relay site, so started with 1200-1300 only, to be increased to schedule given last month (via DSWCI *DX Window*)

USA *WORLD OF RADIO* on WWCR as of late May: Thu 2030 on 15685, Sat 0605 on 3210, 1130 on 5070, 1300 on 15685, Sun 0900 on 3210, 2330 on 5070, Tue 1230 on 15685. At 2330 stays on 5070 after all, since WWCR-3 switch from 12160 to 5070 moved up to 2100 for better propagation even tho it's total summer daylight for new weekday program at 2100 replacing music on Mon & Fri (gh)

David Frantz of WGTG told me that a neighbor accused the station of putting out RF that was giving a young boy who had Down's syndrom, seizures. WGTG responded by taking the station off the air voluntarily. During this time, they underwent an FCC technical inspection, which they passed. Also had a field engineering survey of their RF—not only meets existing standards, but is already in compliance with new standards due in Sept. Same neighbor accused WGTG of being a militia base, recorded some programs off air and played them at local churches. Frantz explained that it's a commercial station renting airtime, and WGTG would rent a hall and explain their operation to the public (Hans Johnson, *Cumbre DX* via *BC-DX*) *Full Disclosure* with Glen Roberts seemed to replace *Domestic SW Report* UT Mon 0000 on 5085, but interrupted by inability to use that frequency due to antenna coupler problem (gh)

New Macon, Georgia, SW station may be called WWBS, only one of 15 possibilities requested which is available (George McClintock, TN) *Hmmm, could that stand for Worldwide Brother Stair??*

WVHA's Sabbath service is now on 17535 around 1500 Sat (Jim Moats, OH) *When they sometimes report on the station's situation (gh)* WVHA registered for 6855 at 0200-0300 (HFCC via Bob Padula, *EDXP*) *Would be second US station on 43mb, but not yet heard (gh)*

Joe Costello of WRNO died April 22 of diabetic complications (RN*MN*) He had three brothers, but left WRNO to Loyola University, although he verbally indicated he wanted the Roman Catholic Archbishop of New Orleans to have it. Loyola is under his jurisdiction, but they may not keep it. Controversial programs probably discontinued, and new shape likely by end of May (George Jacobs via Larry Magne, *DXing with Cumbre*)

More on WRMI being for sale: there are four partners with 25% each. Jeff White and engineer Kiko Espinosa do not want to sell, but two other absentee investors do (Jeff White, HCJB *DX Partyline*) But if someone wants to buy it all and the price is right, maybe we will sell, too; I might stay on to manage it or take the money and start another SW station in Latin America (Jeff White, VOA *Communications World*)

R. Free Asia changed Vietnamese at 1400-1500 from 11600 to 11540, and two +/- 35 kHz spurs on 11505, 11575; then Burmese at 1500-1600 shifts to 11530, and the spurs to 11495, 11565 (Wolfgang Büschel, *BC-DX*) No-data, no-site letter from RFA says they would be broadcasting in Khmer and Laotian by June (Eric Westhead, BDXC *Communication)*

The USIA, of which VOA is a part, will become part of the State Department, raising questions about VOA's role as an advocate versus editorial independence and news credibility (VOA *Communications World*)

BBC has a deal with Public Radio International to provide a news program at 5 a.m. (ET) to fill the vacuum left by Monitoradio, starting July 1, already confirmed on WNYC, WGBH (BBC press via BBCM) But who needs it at 4 a.m. or earlier further west? Another example of Eastern zone chauvinism. NPR also planned to start a pre-*Morning Edition* during that hour (gh)

UZBEKISTAN R. Tashkent 2030-2100 and 2130-2200 English are on 9540 and 9545 (Wolfgang Büschel, *BC-DX*)

RADIO TASHKENT
49 Khorezm Street, Tashkent, Uzbekistan
Tel: (3712) 33-38-94 Fax: 33-60-68

Until the Next, Best of DX and 73 de Glenn!
http://idt.net/~khecht19/ghauser

Broadcast Loggings

GLOBAL FORUM

Gayle Van Horn

0008 UTC on 11750
ASCENSION ISLANDS: BBC WS. Newsdesk in progress at tune-in, with reports on Oklahoma City bombing trial and stock market reports, // 5975, 6175 fair signal quality. Audible on 9600 at 0343. (Jim Moats, Ravenna, OH)

0110 UTC on 4865
BRAZIL: Radio Alvorada. Portuguese. Religious text to lady announcer's comments and music to ID. (Nicholas Eramo, Argentina/*Cumbre DX*) Brazil's **Radio Itatiaia** heard on 5969.95 at 0903 with news and IDs. (Mark Mohrmann, VT/*Cumbre DX*)

0203 UTC on 4945
BOLIVIA: Radio Illimani. Excited male in Spanish with either a sporting event or politician, but no crowd noises. Pop music to 0255 tune out. ID noted as, "La Paz, Radio Illimani La Voz de Bolivia," good signal with SINPO=33233. (James W. Evans/*Cumbre DX*)

0210 UTC on 6479.82
PERU: Radio Los Andes. Folk music to time check, "son las 9 de la noche con 18 minutos," program hosted by male announcer. (Gabriel Ivan Barrera, Argentina/*Cumbre DX*)

0315 UTC on 6205
COSTA RICA: Radio For Peace Int'l. Joel Hardeman program, address for promotional products to report on *RHO Plus* forum. (Steve Clark, Pampa, TX) Jim Hightower's political commentary at tune-in at 2132 on 15050. (Moats, OH)

0317 UTC on 7125
RUSSIA: Voice of Russia. *Commonwealth Update* followed by *Christian Message From Moscow* program. (Stokes Schwartz, Madison, WI; Moats, OH) VOR heard on 7125 at 2250 on stamp collecting. (Fraser, MA)

0321 UTC on 9975
USA: KVOH. Woman reading Bible passages to station ID and ad for shortwave antenna. Promotion for Christian website. Fair to good signal quality. (Moats, OH)

0340 UTC on 9950
SYRIA: Radio Damascus. Text on national items to prayers. (Jerry Witham, Keaau, HI) News in English to station ID, Arabic music and commentary. (Mahendra Vaghjee, Rose Hill, Mauritius)

0345 UTC on 7260
VIETNAM: Voice of Vietnam. Female announcer's text to ID and 0400*. (Witham, HI)

0430 UTC on 5070
USA: WWCR Nashville, TN. Excellent signal for *Golden Age of Radio Theater* featuring the Abbott & Costello show, to station ID and news. (Clark, TX)

0500 UTC on 5975
UNITED KINGDOM: BBC WS. *Newsday* with Claire Bolderson, followed by *Play of the Week* being *Ashes to Ashes* by Harold Pinter. (Schwartz, WI)

0531 UTC on 3290
NAMIBIA: NBC. Musical program to male announcer's ID. (Eramo, ARG)

0538 UTC on 5920
FRANCE: Radio France Int'l. Spanish to the Americas with programming of pop/light music sung in French. Parallel noted on 9800. RFI noted on 7280 at 0550. (Swartz, WI) *Every Woman* program on woman's lifestyles in India improving except for health, // 15210. (Bob Fraser, Cohasset, MA)

0901 UTC on 7370
TURKEY: Turkiye Polis Radyosu. Turkish. Pop songs to talk and Middle Eastern style music. Several mentions of Ankara, Polis Radyosu, with fair signal quality. (Giovanni Serra, Anzio, Italy/*The Four Winds*)

0928 UTC on 15050
INDIA: All India Radio-Aligarh. Indian music to talk in presumed Indonesian. Clear station ID, // 17387, carrier on only with het sounds on all two frequencies. (Serra, Italy)

1100 UTC on 9975
NORTH KOREA: Radio Pyongyang. English programming to North America on // 11335, // 6575 barely audible to 1148*. (Lee Silvi, Mentor, OH)

1115 UTC on 5965
CANADA: BBC WS relay. *News Desk* on Baghdad to sign treaty with Germany to develop oil fields in southern Iraq. (Fraser, MA)

1120 UTC on 6120
CANADA: Radio Japan/NHK World. Feature on Burmese Water Festival just being held in Tokyo. (Fraser, MA)

1339 UTC on 15295
UZBEKISTAN: Radio Tashkent. National anthem to national news about relations between Italy and Uzbekistan and the visit of the Italian President of Italian Republic. Station ID and commentaries. (Serra, Italy)

1610 UTC on 6210
ETHIOPIA: Radio Fana. Two males in regional language to African pop song. Lengthy text to more music programming. (Vaghjee, MAU)

1705 UTC on 4935
KENYA: KBC Nairobi. Religious programming discussing problems in the family, and problems of divorce. Musical programs, ID, time check and advertisements. (Vaghjee, MAU)

1710 UTC on 5027
PAKISTAN: Radio Pakistan. Male/female announcers in presumed Pakistani with national news and station ID. Additional monitoring heard on 5824 at 1750. (Witham, HI)

1800 UTC on 6120
OMAN: Radio Oman. Sign-on in Arabic to news and commentary. (Nikolay Pashkevich, Russia/*Cumbre DX*)

1840 UTC on 13695
TURKEY: Voice of Turkey. *Press Review* covering a call for the world to recognize the Turkish Federated State of Cyprus, // 9445; 2230 on 9655.. (Fraser, MA) Station noted on 9655 at 0310. (Witham, HI)

1850 UTC on 5890
GERMANY: Voice of Mediterranean via Julich. Test transmission with fair signal quality. English ID and folk style music to 1900*. Sam Wright, Biloxi, MS)

1905 UTC on 11605
ISRAEL: Kol Israel. Item that restrictions on Palestinian workers in the Gaza Strip have eased, // 9435. (Fraser, MA)

1913 UTC on 13860
ICELAND: Rikisutvarpid. (Tent) Male/female announcers with news and comments, probably in Icelandic, to 1930*. (Barrera, ARG)

1935 UTC on 11720
BULGARIA: Radio Bulgaria. Report on the national industrial plants, // 9700. (Tom Banks, Dallas, TX)

1943 UTC on 9670
ITALY: RAI. News item on nation being shocked by actions of two girls who became streetwalkers to have money enough to buy designer jeans, // 7230. (Fraser, MA) Station noted on 6010//9675 at 0050. (Moats, OH)

2001 UTC on 15110
MALI: China Radio Int'l relay. World news bulletin at tune-in, followed by *News About China* at 2010 with report on national economy // 11715 fair to poor signal quality. (Moats, OH)

2100 UTC on 7110
ALBANIA: Radio Tirana. News mostly on the cooperation with the multinational force and preparing for the upcoming national elections, // 9515. (Fraser, MA)

2126 UTC on 7375
BOTSWANA: Voice of America relay. *World Report* with coverage on European dam dispute, fair signal quality. (Moats, OH)

2142 UTC on 7225
SOUTH AFRICA: Investment Channel. Promo for supermarket fund to ID, phone and fax number. Feature on mutual funds with fair signal quality. (Moats, OH) Station noted on 17778 at 1330. (Ray Stickney, Gilford, NH; Aldon Wires, East Point, GA) *For everyone who is reporting this as coming from Liechtenstein, it is (or was) in fact broadcasting from Meyerton, South Africa. - ed.*

2146 UTC on 5003.46
EQUATORIAL GUINEA: Radio Nacional Bata. Folk music in vernaculars. At 2157 national anthem, then sign-off at 2200. (Barrera, ARG)

2150 UTC on 6203.72
PERU: Radio Cuzco. Spanish. Melodic music by Jose Luis Rodriguez at 2157. ID as, "desde el Cuzco al mundo, esta es Radio Cuzco..." by male announcer to local music. (Barrera, ARG)

2201 UTC on 7475
TUNISIA: RTV Tunisienne. Arabic announcer to regional music and two presumed rallies with "live" coverage. (Silvi, OH)

2336 UTC on 4875
BOLIVIA: La Cruz del Sur. Quechua and advertisement in Spanish. Women mentioned, "Iglesi Bautistas" ID with poor to bad quality. (Eramo, ARG)

Thanks to our contributors — Have you sent in YOUR logs?
Send to ***Gayle Van Horn,*** *c/o Monitoring Times (or e-mail gayle@grove.net)*
English broadcast unless otherwise noted.

Gayle Van Horn, gayle@grove.net

All India Radio ... It's All There!

Perhaps it is the vibrant, haunting sounds of the sitar and tabla drums, or the mysteries of the subcontinent, but All India Radio provides its listeners with a sampler from a world of diversity and intrigue.

If DXing India is your *forte*, log onto the AIR Internet Service site, which provides national news and frequency schedules, plus Real Audio links, at **<http://air.kode.net/index1.html>** Other features include cultural links for news and music.

The Ontario DX Association's mail order division provides the most comprehensive review of the Indian broadcasting scene in their publication *India BroadBase*. *IBB* covers longwave through satellites, VHF-FM, television, mediumwave, charts, frequency schedules, maps, and future plans. For current pricing information send your request with an SASE to: Ontario DX Association, P.O. Box 161, Station A, Willowdale, Ontario M2N 5S8 Canada.

Don't forget return postage when reporting to All India Radio. Mint stamps or IRCs are preferred and be aware that replies may be erratic. Reports to domestic stations are more likely to reply via the External Services Division in New Delhi. See *Passport to World Band Radio* for complete listings in "Addresses Plus."

COASTAL STATIONS

OXZ Lyngby Radio, 12592 kHz (Telex). Full data prepared QSL card signed by J. Christensen-OZ8AE, Radio Officer. OXZ's own QSL card with friendly personal message included and info sheet. Received in 17 days for an English utility report and one U.S. dollar. Station address: Tele Danmark, Servicetelefonen, Lyngby Radio, Bagvaerd Mollevej 3, 2800 Lyngby, Denmark. (Note to hams: Mr. Christensen is active daily in the CW portion of the 20-meter ham band 14041 kHz around 1600 UTC.) (Randy Stewart, Springfield, MO)

ZBM, Bermuda Harbour Radio, 500 kHz. Full data verification letter signed by Joe Pagnam-Radio Officer/RCC Controller. Received for an English report and one U.S. dollar. Station address: Government of Bermuda, Department of Marine & Ports Services-Rescue Co-ordination Centre, Bermuda Harbour Radio-ZBM, 9 Fort George Hill, St. George's, Bermuda GE02, Bermuda. (Hank Holbrook, Dunkirk, MD)

ICELAND

National BC Service, 11402 kHz. Full data *Amazing Blue Lagoon* card with initial signature. Received in 21 days for an English report. Station address: Efstaleiti 1, 150 Reykjavik, Iceland. (George Knight, Garfield, NJ; Mahendra Vaghje, Rose Hill, Mauritius)

INDIA

All India Radio via Jaipur, 3345 kHz. Full data QSL signed by A.V. Bhashvani-Chief Engineering Officer. Received in 74 days for an English report and one IRC. Station address: AIR, Akashvani Broadcasting House, New Delhi 110 001 India. (R. Pavanello, Italy/*TFW*)

All India Radio via Aligarh, 9910 kHz. Full data archaeological site card, signed by A.K. Bhatnagar-Director/Frequency Assignments. Received in 75 days after English follow-up report, two IRCs, SASE (unused for reply) and souvenir postcards. Station address: c/o External Services Divisions, Parliament Street, P.O. Box 500, New Delhi 110 001 India. (Gayle Van Horn, Brasstown, NC)

All India Radio via Delhi, 11620 kHz. Full data scenery card, signed by A.K. Bhatnagar-Director/Frequency Assignments. Received in 102 days for an English report, return mint postage, and an SASE (unused for reply). Station address: c/o External Services Divisions, Parliament Street, P.O. Box 500, New Delhi 110 001 India. (Frank Hillton, Charleston, SC)

All India Radio via Thiruvananthapuram (domestic station) 5010 kHz. Full data prepared QSL card signed and stamped by station engineer with illegible signature. Typed on card as, "the broadcast is meant for regional coverage in Malayalam, the local language." Station address: P.O. Box 403, Bhakti Vilas, Vazuthacaud, Thiruvananthapuram-695 014, Kerala, India. (Steve Martin, CA/*Cumbre DX*)

MEDIUM WAVE

CJME 1300 kHz AM. Full data card signed by David Senft-VP Engineering and station stickers. Received in 43 days for an English report, return mint postage, and souvenir postcard. Station address: Rawlco Communications Ltd., 210, 2401 Saskatchewan Dr., Regina SK, S4P 4H8, Canada. (Terry Jones, Plankinton, SD)

CJVR 750 kHz AM. Verification letter signed by Bayne Opseth-Chief Engineer. Received for an English report and return mint postage. Station address: Box 750, Melfort, SK, SOE 1AO Canada. (Jones, SD)

MOLDOVA

Voice of Russia relay, 7125 kHz. Full data Radio Moscow QSL card showing Moscow's Cosmos Hotel. Personal note from Eugenia Stepanova-Letters Dept. Received in 30 days for an English report. Station address: Pyatnitskaya ul. 25, 113326 Moscow, Russia. (Stewart, MO)

NAMIBIA

NBC Radio, 3290 kHz. Full data QSL card signed by P. Schachschneider-Manager. Received in 35 days for an English report and two IRCs. Station address: Box 321, Windhoek, Namibia. (Vaghjee, MAU)

SHIP TRAFFIC

Nord Energy OUUR5, 156.65 MHz (Bulk Carrier). Full data verification letter and photo of ship, with notation of "this is a GMDSS system and no longer carries a Radio Officer." Received for an English utility report and one U.S. dollar. Ship address: D/S Norden A/S, 49 Amaliegade, DK-1256 Copenhagen K, Denmark. (Holbrook, MD)

Kimolos SWFE, 500 kHz (Tanker). Full data verification letter. Received for an English utility report and one U.S. dollar. Ship address: Aelos Management S.A., 16 Il Merarchias St., 185-35 Piraeus, Greece. (Holbrook, MD)

ST. HELENA

Radio St. Helena, 11092.5 kHz. Full data station map/logo card signed by Tony Leo-Station Manager. Received in 179 days for an English report and two U.S. dollars. Station address: The Castle, Jamestown, St. Helena, South Atlantic Ocean. (Tony Benbenek, East Hampton, NY; Patrick M. Griffith, Federal Heights, CO; Vaghjee, MAU; Walt Szczepaniak, Philadelphia, PA)

UGANDA

Radio Uganda, 4976 kHz. Full data verification on station letterhead, signed by Rachel Nakibuuka. Received in 36 days for an English report, cassette tape of programming, two U.S. dollars, and an SASE (used in reply). Station address: c/o Ministry of Information, P.O. Box 2038, Kampala, Uganda. (Stewart, MO)

UNITED STATES

Voice of America via Delano, CA, 13740 kHz. Full data QSL card, plus souvenirs including a VOA tote bag, T-shirt, bumper sticker, poster, and personal letter for being among contest winners via *Report to the Caribbean* program. Station address: VOA, U.S. Information Agency (USIA), International Broadcasting Bureau (IBB), 330 Independence Avenue SW, Washington, DC 20547. (Kevin B. Conklin, Staten Island, NY)

VANUATU

Radio Vanuatu, 3945 kHz. Full data QSL card unsigned. Received in 40 days for an English report and one U.S. dollar. Station address: PMB 049, Port Vila, Vanuatu. (Lee Silvi, Mentor, OH; Frank Hillton, Charleston, SC)

How to Use the Shortwave Guide

1: Convert your time to UTC.

Eastern and Pacific Times are already converted to Coordinated Universal Time (UTC) at the top of each page. The rule is: convert your local time to 24-hour format; add (during Daylight Savings Time) 4,5,6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (8:30 pm Eastern, 5:30 pm Pacific).

2: Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours—space does not permit 24-hour listings.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The letter stands for a day of the week, as indicated below, and the four digits represent a time in UTC.

S: Sunday T: Tuesday H: Thursday A: Saturday
M: Monday W: Wednesday F: Friday

3: Find the frequencies for the program or station you want to hear.

Look at the page which corresponds to the time you will be listening. Comprehensive frequency information for English broadcasts can be found at the top half of the page. All frequencies are in kHz.

The frequency listing uses the same day codes as the program listings; if a broadcast is not daily, those day codes will appear before the station name. Irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

4: Choose the most promising frequencies for the time, location and conditions.

Not all stations can be heard and none all the time on all frequencies. To help you find the most promising frequency, we've included information on the target area of each broadcast. Frequencies beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible. Every frequency is followed by one of these target codes:

am:	The Americas	as:	Asia
na:	North America	au:	Australia
ca:	Central America	pa:	Pacific
sa:	South America	va:	various
eu:	Europe	do:	domestic broadcast
af:	Africa	om:	omnidirectional
me:	Middle East		

Consult the propagation charts. To further help you find the right frequency, we've included charts at the back of this section which take into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the region in which you live and find the chart for the region in which the station you want to hear is located. The chart indicates the optimum frequencies for a given time in UTC.

Hot News

Programming Tips by Jim Frimmel

Hong Kong in Transition

Be sure to keep up with how the Chinese are handling their newly acquired territory by listening to China Radio International (CRI), and also get the BBC's coverage of the loss of the last vestige of the British Empire by tuning in the World Service. See our frequency listings for times and target areas.

BBC Replaces Monitor Radio

In association with Public Radio International (PRI), the BBC World Service launches this month a new global news program specifically for US PRI stations. The 50-minute program targets the morning drive time period and fills the void left by the discontinuance of Monitor Radio on "Early Edition."

New Canadian Station

Brock University in St. Catharines, Ontario, was granted a license to broadcast a campus and community radio station as CBFU transmitting on 103.7 FM. The new station is looking for donations of old LPs, CDs, tapes, etc. to help get them started. Send those gifts to Brock Radio Collective, 500 Glenridge Ave., St. Catharines, Ontario L2S 3A1. Check out their web page at **www.vaxxine.com/cfbu/** for more info.

Investment Channel Gone

The Investment Channel, a US-based financial advice service that began broadcasting throughout Africa in late March 1997 via Sentech shortwave transmitters in South Africa, ceased operation in May. It is assumed that the short-lived scheme to attract African investors was a flop.

Voice of Nigeria Returns

The Nigerian government is now providing full shortwave service on 7225 kHz in English from 0500-0800, 1600-1700, and 1900-2200 UTC after about 18 months of inactivity due to equipment failure. The station is using new transmitters acquired from Switzerland.

The Latest on Internet Radio

Another newcomer to live broadcasting over the Internet via RealAudio is the shortwave service of WEWN Worldwide Catholic Radio via EWTN's website at **www.ewtn.com**. The simulcast is a 24-hour service. WEWN also introduced a new, live, call-in talk show in June called *The Journey Home*. The hour-long program can be heard Fridays at 8PM EDT and is repeated Sundays at 7AM EDT. Check out these other web sites broadcasting in RealAudio:

CKWE: The Mohawk Nation low-powered radio station at Tyendinaga, Ontario (interesting and unusual stuff) (**www.suckercreek.on.ca/kweradio/**).

RTE: Live from Dublin, Ireland, is 2FM in stereo sound (**www.rte.ie/2fm/**).

PRT: Classical music live from Philharmonic Radio Taipei (**www.prtmusic.com.tw/index.html**).

Egypt: In conjunction with Egypt's Media Day on 21 May, President Mubarak inauguarated the broadcasting of an Egyptian television channel on the internet. The new service will coincide with the first Egyptian radio station on the global network. (No URL address was available at press time.)

Barbados: The Caribbean News Agency (Cana) is now broadcasting "Caribbean Tempo," a daily 15-minute news magazine in RealAudio (via World Radio Network) (**www.wrn.org/stations/cana.html**).

France: France Info **www.radio-france.fr/france-info/** is now broadcasting live in French. While you're at it, be sure to take a look at ComFM, a French directory of web sites of radio, TV, satellite, WebCams, and live internet broadcasting (**http://www.comfm.fr/sites/rdirect/index.html**). It's definitely worth bookmarking. Although written entirely in French, you should have no trouble using this directory of internet links.

Frequencies

0000-0100	Anguilla,Caribbean Beacon	6090am			
0000-0100	Australia, Radio	13605pa	15415as	15510as	17750as
0000-0100 vl	Australia, VL8K Katherine	5025do			
0000-0100 vl	Australia, VL8T Tent Crk	4910do			
0000-0015	Cambodia, Natl Voice of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFCX Montreal	6005do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0100	China, China Radio Intl	9710na	11695na		
0000-0010	Croatia, Croatian Radio	5895na	7370eu		
0000-0027	Czech Rep, Radio Prague	5930na	7345na		
0000-0100	Ecuador, HCJB	9745am	21455am		
0000-0030	Egypt, Radio Cairo	9900na			
0000-0015 vl	Ghana, Ghana Broadc Corp	3366do	4915do		
0000-0045	India, All India Radio	7150as	9705as	9950as	11620as
0000-0100	Japan, R Japan/NHK World	6155eu	6180eu		
0000-0030	Kazakhstan, Radio Almaty	6230eu			
0000-0100	Lebanon, Voice of Hope	9960va			
0000-0100	Liberia,LCN/R Liberia Int	5100do			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Kuching	7160do			
0000-0100	Netherlands, Radio	6020na	6165na	9845na	
0000-0100	New Zealand, R NZ Intl	15115pa			
0000-0050	North Korea, R Pyongyang	11335na	13760na	15130na	
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Russia,Voice of Russia WS	7105na	7125na	7250na	
0000-0030 mtwhfa	Serbia, Radio Yugoslavia	9580na	11870na		
0000-0100	Spain, R Exterior Espana	6055am			
0000-0030	Thailand, Radio	9690af			
0000-0100	Ukraine, R Ukraine Intl	5905na	6010na	6020na	6090na
0000-0100	United Kingdom, BBC WS	7150na 9550na 5965as 6195as 11955as	7180na 9560na 5970am 9410as 15310as	7240na 9905na 5975am 9590am	9150na 12040na 6175am 11750sa
0000-0045	United Kingdom, BBC WS	3915as			
0000-0030	United Kingdom, BBC WS	7110as	9580as	11945as	15280as
0000-0100	USA, KAIJ Dallas TX	5810am			
0000-0100	USA, KTBN Salt Lk City UT	15590am			
0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0100	USA, Monitor Radio Intl	7535na	9430sa	15665as	15725as
0000-0100	USA, Voice of America	7215as 15290as	9770as 17735as	11760as 17820as	15185as
0000-0100 twhfa	USA, Voice of America	5995am 9775am	6130am 11695am	7405am 13740am	9455am
0000-0100	USA, WEWN Birmingham AL	5825eu	6890na	15375sa	
0000-0100	USA, WGTG McCaysville GA	5085am			
0000-0100	USA, WHRI Noblesville IN	7315am	17510am		
0000-0100	USA, WINB Red Lion PA	11950am			
0000-0100	USA, WJCR Upton KY	7490na			
0000-0100	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355am			
0000-0100	USA, WWCR Nashville TN	3215am	5070am	7435am	13845am
0000-0100	USA, WYFR Okeechobee FL	6085na	9505ca		
0030-0100	Australia, Radio	9660pa 15365pa	11640as 17795pa	12080pa 17860pa	13755pa 17880pa
0030-0055	Austria, R Austria Intl	9655na			
0030-0100	Iran, VOIRI	6050eu	9022eu	9685eu	
0030-0100	Lithuania, Radio Vilnius	9875na			
0030-0100	Netherlands, Radio	5905as	7305as	9855as	11655as
0030-0100	Sri Lanka, Sri Lanka BC	9730as			
0030-0100	Thailand, Radio	15370as			
0035-0040	India, All India Radio	4860do 11870do	5050do	7110do	11830do
0050-0100	Italy, RAI Intl	6010na	9675na	11800na	

Selected Programs

Sundays

0000 China, China Radio Intl: News. A ten-minute summary of world news.
0000 Japan, NHK/Radio: News. World news from NHK International.
0000 Russia, Voice of: News. Every hour on the hour.
0010 China, China Radio Intl: News about China. Ten minutes of home news.
0010 Japan, NHK/Radio: Let's Learn Japanese. A course in the Japanese language.
0011 Russia, Voice of: Moscow Mailbag. Joe Adamov answers listener questions.
0017 China, China Radio Intl: Chinese Folktales. The traditions, moral values, etiquette and customs of this ancient country and stories about real and legendary figures of China.
0023 China, China Radio Intl: The Cooking Show. Chinese recipes and cooking tips direct from Beijing.
0025 Japan, NHK/Radio: Profile. An in-depth interview with a Japanese personality.
0027 China, China Radio Intl: China Scrapbook. Snippets of facts about China's past and present.
0030 Russia, Voice of: News in Brief. Ninety seconds news summary every hour on the half-hour.
0032 Russia, Voice of: Audio Book Club. The best of Russian classic and contemporary literature.
0035 China, China Radio Intl: Music from China. Chinese music from traditional to pop to annual music festivals.

Mondays

0000 China, China Radio Intl: News. See S 0000.
0000 Japan, NHK/Radio: News. See S 0000.
0000 Russia, Voice of: News. See S 0000.
0010 China, China Radio Intl: News about China. See S 0010.
0011 Russia, Voice of: Moscow Mailbag. See S 0011.
0013 China, China Radio Intl: Sports Beat. See S 1413.
0015 Japan, NHK/Radio: 44 Minutes. The weekday magazine program of feature reports and the popular vocal music of Japan.
0020 China, China Radio Intl: China Snapshots. See S 1420.
0025 China, China Radio Intl: In the Third World. See S 1425.
0032 Russia, Voice of: Russian by Radio. See S 0632.
0035 China, China Radio Intl: Song of the Week. See S 1435.
0045 China, China Radio Intl: Listeners' Letterbox. See S 1445.

Tuesdays

0000 China, China Radio Intl: News. See S 0000.
0000 Japan, NHK/Radio: News. See S 0000.
0000 Russia, Voice of: News. See S 0000.
0010 China, China Radio Intl: News about China. See S 0010.
0011 Russia, Voice of: Focus on Asia and the Pacific. News and comments on events in the region.
0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
0020 China, China Radio Intl: Current Affairs. See M 1420.
0030 China, China Radio Intl: Press Clippings. See M 1430.
0030 UK, BBC London (AE): Red Hills of Home (1st,8th). Reflections on life in Zimbabwe since the transformation from Rhodesia.
0032 Russia, Voice of: This is Russia. See S 0532.
0034 China, China Radio Intl: China's Open Windows. See M 1434.
0039 China, China Radio Intl: Changzhou Reports. See M 1439.
0045 China, China Radio Intl: Idioms and Their Stories. See M 1445.

Wednesdays

0000 China, China Radio Intl: News. See S 0000.
0000 Japan, NHK/Radio: News. See S 0000.
0000 Russia, Voice of: News. See S 0000.
0010 China, China Radio Intl: News about China. See S 0010.
0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0015 China, China Radio Intl: News Analysis. See T 1415.
0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
0019 China, China Radio Intl: Current Affairs. See M 1420.
0032 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0033 China, China Radio Intl: Press Clippings. See M 1430.
0038 China, China Radio Intl: Orient Arena. See T 1438.
0045 China, China Radio Intl: Listeners' Letterbox. See S 1445.

Thursdays

0000 China, China Radio Intl: News. See S 0000.
0000 Japan, NHK/Radio: News. See S 0000.
0000 Russia, Voice of: News. See S 0000.
0010 China, China Radio Intl: News about China. See S 0010.
0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
0020 China, China Radio Intl: Current Affairs. See M 1420.
0032 Russia, Voice of: This is Russia. See S 0532.
0033 China, China Radio Intl: Press Clippings. See M 1430.
0038 China, China Radio Intl: Profile. See W 1438.
0045 China, China Radio Intl: Learn to Speak Chinese. See W 1445.

Fridays

0000 China, China Radio Intl: News. See S 0000.
0000 Japan, NHK/Radio: News. See S 0000.
0000 Russia, Voice of: News. See S 0000.
0010 China, China Radio Intl: News about China. See S 0010.
0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0015 China, China Radio Intl: News Analysis. See T 1415.
0015 Japan, NHK/Radio: 44 Minutes. See M 0015.
0019 China, China Radio Intl: Current Affairs. See M 1420.
0032 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0034 China, China Radio Intl: Press Clippings. See M 1430.
0038 China, China Radio Intl: Focus. See H 1438.
0044 China, China Radio Intl: Cultural Spectrum. See H 1444.

Saturdays

0000 China, China Radio Intl: News. See S 0000.
0000 Japan, NHK/Radio: News. See S 0000.
0000 Russia, Voice of: News. See S 0000.
0010 China, China Radio Intl: News about China. See S 0010.
0010 Japan, NHK/Radio: Weekend Break. See M 0125.
0011 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0020 China, China Radio Intl: Current Affairs. See M 1420.
0032 Russia, Voice of: This is Russia. See S 0532.
0034 China, China Radio Intl: Life in China. See F 1434.
0046 China, China Radio Intl: Global Review. See F 1446.

Hauser's Highlights
France: Radio France Int'l

Z-97 English:

UTC	kHz
1200	9805, 11600, 13625, 15155, 15195, 15540, 17575
1400	7110, 11910, 15405, 17560
1600	11615, 11700, 12015, 15210, 15460, 15530
1700-1730	15210, 15460

(TDF/RFI via Jacques d'Avignon, Ont.)

Frequencies

0100-0200	Anguilla,Caribbean Beacon	6090am			
0100-0200	Australia, Radio	9660pa	11640as	12080pa	13605pa
		13755pa	15365pa	15415as	15510as
		17715as	17750pa	17795pa	17860pa
		17880pa			
0100-0200 vl	Australia, VL8K Katherine	5025do			
0100-0200 vl	Australia, VL8T Tent Crk	4910do			
0100-0200	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFCX Montreal	6005do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0200	Canada, R Canada Intl	9535am	9755am	11715am	13670am
0100-0200	Costa Rica,RF Peace Intl	6205am	7385am		
0100-0110	Croatia, Croatian Radio	5895na			
0100-0200	Cuba, Radio Havana	6000na	9820na	9830na	
0100-0127	Czech Rep, Radio Prague	6200na	7345na		
0100-0200	Ecuador, HCJB	9745am	21455am		
0100-0150	Germany, Deutsche Welle	6040na	6085na	6145na	9640na
		11810na			
0100-0115	Ghana, Ghana Broadc Corp	3366do	4915do		
0100-0130	Hungary, Radio Budapest	6075na	6190na	9580na	
0100-0200	Indonesia, Voice of	9525na			
0100-0125	Iran, VOIRI	6050eu	9022eu	9685eu	
0100-0200 th	Ireland,W Coast R Ireland	9875am			
0100-0110	Italy, RAI Intl	6010na	9675na	11800na	
0100-0200	Japan, R Japan/NHK World	5960na	11790as	11860as	11890na
		13630am	15500as	15590as	17810as
		21610as			
0100-0200	Lebanon, Voice of Hope	9960va			
0100-0200	Liberia,LCN/R Liberia Int	5100do			
0100-0200 smtwh	Malaysia, Radio	7295do			
0100-0125	Netherlands, Radio	6020na	6165na	9845na	
0100-0200	Netherlands, Radio	5905as	7305as	9855as	
0100-0200	New Zealand, R NZ Intl	15115pa			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC/R Intl	15450as			
0100-0200	Russia,Voice of Russia WS	7105na	12010na	12050na	13665na
		15180na	15595na		
0100-0130	Slovakia, R Slovakia Intl	5930na	7300na	9440sa	
0100-0200	Spain, R Exterior Espana	6055am			
0100-0200	Sri Lanka, Sri Lanka BC	9730as			
0100-0130	Switzerland, Swiss R Intl	6135na	9885na	9905ca	
0100-0200	United Kingdom, BBC WS	5965as	5970sa	5975am	6085am
		6145am	6175am	6195as	9410as
		9590am	9605as	11750am	11955as
		15280as	15310as	15360as	
0100-0200	USA, KAIJ Dallas TX	5810am			
0100-0200	USA, KJES Mesquite NM	7555am			
0100-0200	USA, KTBN Salt Lk City UT	7510am			
0100-0200	USA, KWHR Naalehu HI	17510au			
0100-0200	USA, Monitor Radio Intl	7535na	9430am		
0100-0200	USA, Voice of America	7115as	7205as	9635as	11705as
		11725as	15170as	15250as	17740as
		17820as			
0100-0200 twhfa	USA, Voice of America	5995am	6130am	7405am	9445am
		9775am	13740am		
0100-0200	USA, WEWN Birmingham AL	5825eu	6890na	15375na	
0100-0200	USA, WGTG McCaysville GA	5085am			
0100-0200	USA, WHRI Noblesville IN	5745am	7315am	17510am	
0100-0200	USA, WINB Red Lion PA	11950am			
0100-0200	USA, WJCR Upton KY	7490na			
0100-0200	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355am			
0100-0200 mtwhf	USA, WVHA Greenbush ME	5850eu			
0100-0200	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0130	Uzbekistan, R Tashkent	7190eu	9375eu	9530eu	9715eu
0100-0126	Vietnam, Voice of	7240na			
0130-0150	Greece, Voice of	6260na	7450na	9420na	9935na
0130-0200	Netherlands, Radio	5905as	9855as	11655as	
0130-0200	Sweden, Radio	9435as			
0130-0200 s	Sweden, Radio	7290am			
0140-0159	Vatican State, Vatican R	5980as	7335as		
0145-0200	Albania, R Tirana Intl	6115na	7160na		

Selected Programs

Sundays

0100 Germany, Deutsche Welle: News. Eight minutes of world news from Deutsche Welle.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: Sports Report. The latest news from the world of sports.
0109 Germany, Deutsche Welle: Inside Europe. A radio magazine offering a European perspective on events of the week.
0110 Japan, NHK/Radio: Hello from Tokyo. The weekend magazine program.
0111 Russia, Voice of: Music and Musicians. World-famous performers and composers play for you.
0138 Germany, Deutsche Welle: Mailbag. Listener mail from the Americas is answered.

Mondays

0100 Germany, Deutsche Welle: News. See S 0100.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: Commentary. See S 1106.
0108 Germany, Deutsche Welle: Arts on the Air. See S 1108.
0108 Germany, Deutsche Welle: Feature of the Month (1). See S 1108.
0111 Russia, Voice of: Music and Musicians. See S 0111.
0115 Japan, NHK/Radio: Asian Top News. The most important stories from other Asian media organizations are summarized in a new 10-minute format.
0125 Japan, NHK/Radio: Sound of Asia. No information available.
0130 UK, BBC London (AE): Living Together (30th,7th,14th). The stories of immigrants and the the problems of British immigration.
0133 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0100 Germany, Deutsche Welle: News. See S 0100.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: NewsLink. See M 1106.
0111 Russia, Voice of: Commonwealth Update. Commonwealth of Independent States (CIS) developments.
0115 Japan, NHK/Radio: Asian Top News. See M 0115.
0125 Japan, NHK/Radio: Enjoy Japanese. Learn and practice the Japanese language.
0132 Russia, Voice of: Folk Box. See S 2332.
0133 Germany, Deutsche Welle: Man and Environment. Various topics relating to the environment in industrial and developing countries.

Wednesdays

0100 Germany, Deutsche Welle: News. See S 0100.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: NewsLink. See M 1106.
0111 Russia, Voice of: Commonwealth Update. See T 0111.
0115 Japan, NHK/Radio: Asian Top News. See M 0115.
0125 Japan, NHK/Radio: Music Reflections. Music from around the world which shares a common theme.
0132 Russia, Voice of: Music at Your Request. See M 1132.
0133 Germany, Deutsche Welle: Insight. A weekly analysis of major developments on the international scene.

Thursdays

0100 Germany, Deutsche Welle: News. See S 0100.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: NewsLink. See M 1106.
0111 Russia, Voice of: Commonwealth Update. See T 0111.
0115 Japan, NHK/Radio: Asian Top News. See M 0115.
0132 Russia, Voice of: The Jazz Show. See M 0432.
0133 Germany, Deutsche Welle: Living in Germany. A weekly look at the social and political issues in the 1990s.

Fridays

0100 Germany, Deutsche Welle: News. See S 0100.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: NewsLink. See M 1106.
0111 Russia, Voice of: Commonwealth Update. See T 0111.
0115 Japan, NHK/Radio: Asian Top News. See M 0115.
0125 Japan, NHK/Radio: Music Beat. What people in Japan are listening to.
0132 Russia, Voice of: Music at Your Request. See M 1132.
0133 Germany, Deutsche Welle: Headcrash (4). See M 0233.
0133 Germany, Deutsche Welle: Made in Germany (3). See M 0233.
0133 Germany, Deutsche Welle: MediaMag (2). See M 0233.
0133 Germany, Deutsche Welle: Science and Technology (1). See M 0233.

Saturdays

0100 Germany, Deutsche Welle: News. See S 0100.
0100 Japan, NHK/Radio: News. See S 0000.
0100 Russia, Voice of: News. See S 0000.
0106 Germany, Deutsche Welle: NewsLink. See M 1106.
0110 Japan, NHK/Radio: Asia Weekly. A magazine of news from other Asian broadcasters, entertainment update and music.
0111 Russia, Voice of: Commonwealth Update. See T 0111.
0131 Germany, Deutsche Welle: Economic Notebook. The economic scene in Germany and around the world.
0132 Russia, Voice of: The Jazz Show. See M 0432.

Hauser's Highlights

BANGLADESH: Bangladesh Betar

Z-97 in English, external:

UTC	kHz
1230-1300	7185, 9550
1745-1815	7185, 9550

V. of Islam
1815-1900 7190, 9570, 15520

Home service:
0200-0210 4880
1600-1610 4880, 15520

Current affairs in English:

1545-1600	Sun, Thu	4880
1610-1615	daily	4880

(Alok Das Gupta, India, *Electronic DX Press*)

0200 UTC SHORTWAVE GUIDE

10:00 PM EDT
7:00 PM PDT

Frequencies

0200-0300	Anguilla,Caribbean Beacon	6090am				
0200-0300 t-th/vl	Argentina, RAE	11710am				
0200-0300	Australia, Radio	13605pa	13755pa	15240pa	15415as	
		15510as	17715as	17750pa	17795pa	
0200-0300 vl	Australia, VL8K Katherine	5025do				
0200-0300 vl	Australia, VL8T Tent Crk	4910do				
0200-0210	Bangladesh, Bangla Betar	4880do				
0200-0300	Canada, CBC N Quebec Svc	9625do				
0200-0300	Canada, CFCX Montreal	6005do				
0200-0300	Canada, CFRX Toronto	6070do				
0200-0300	Canada, CFVP Calgary	6030do				
0200-0300	Canada, CHNX Halifax	6130do				
0200-0300	Canada, CKZN St John's	6160do				
0200-0300	Canada, CKZU Vancouver	6160do				
0200-0300	Canada, R Canada Intl	6120am	9535am	9755am	11715am	
		13670am				
0200-0300	Costa Rica,RF Peace Intl	6205am	7385am			
0200-0210	Croatia, Croatian Radio	5895na				
0200-0300	Cuba, Radio Havana	6000na	9820na	9830na		
0200-0300	Ecuador, HCJB	9745am	21455am			
0200-0300	Egypt, Radio Cairo	9475na				
0200-0250	Germany, Deutsche Welle	7285as	9615as	9690as	11945as	
		11965as	12045as			
0200-0300 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do		
0200-0300	Lebanon, Voice of Hope	9960va				
0200-0300 smtwh	Malaysia, Radio	7295do				
0200-0300 s	Malta, VO Mediterranean	15550as	17570au			
0200-0230	Netherlands, Radio	5905as	7305as	9855as	9855as	
0200-0300	New Zealand, R NZ Intl	15115pa				
0200-0230 m	Norway, Radio Norway Intl	7465na	9560na			
0200-0300 vl	Papua New Guinea, NBC	9675do				
0200-0300	Philippines, FEBC/R Intl	15450as				
0200-0256	Romania, R Romania Intl	5990na	6155na	9510na	9570na	
		11940na	12990na			
0200-0300	Russia,Voice of Russia WS	7105na	12010na	12050na	13645na	
		13665na	15180na	15595na		
0200-0230	Serbia, Radio Yugoslavia	7130na				
0200-0300	South Korea, R Korea Intl	7275as	11725am	11810am	15575am	
0200-0300	Sri Lanka, Sri Lanka BC	9730as				
0200-0300	Taiwan, VO Free China	5950na	7130as	9680na	11740ca	
		11825as	15345as			
0200-0300	United Kingdom, BBC WS	5970sa	5975am	6135af	6175am	
		6195eu	9410va	9605as	11955as	
		15280as	15310as	15360as		
0200-0230	United Kingdom, BBC WS	9590am	9915am			
0200-0300	USA, KAIJ Dallas TX	5810am				
0200-0230	USA, KJES Mesquite NM	7555am				
0200-0300	USA, KTBN Salt Lk City UT	7510am				
0200-0300	USA, KVOH Los Angeles CA	9975am				
0200-0300	USA, KWHR Naalehu HI	17510au				
0200-0300	USA, Monitor Radio Intl	5850na	7535am			
0200-0300	USA, Voice of America	7115as	7205as	9635as	11705as	
		11725as	15170as	15250as	17740as	
		17820as				
0200-0300	USA, WEWN Birmingham AL	5825eu	6890na			
0200-0300	USA, WGTG McCaysville GA	5085am				
0200-0300	USA, WHRI Noblesville IN	5745am	7315am	17510am		
0200-0300	USA, WINB Red Lion PA	11950am				
0200-0300	USA, WJCR Upton KY	7490na				
0200-0300 mtwhf	USA, WRMI/R Miami Intl	9955am				
0200-0300	USA, WRNO New Orleans LA	7355am				
0200-0300	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am	
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na			
0215-0225	Nepal, Radio	7165do				
0230-0300	Albania, R Tirana Intl	6140na	7160na			
0230-0259	Austria, R Austria Intl	9655na	9870sa	13730sa		
0230-0300	Hungary, Radio Budapest	6190na	9840na	11910na		
0230-0300	Netherlands, Radio	9855as	11655as			
0230-0245	Pakistan, Radio	7255as	15120as	15485as	17705as	
0230-0300 vl	Philippines, R Pilipinas	11885me	15120me	15270me		
0230-0300	Sweden, Radio	7135na				
0230-0300	United Kingdom, BBC WS	7325am	9895am			
0230-0256	Vietnam, Voice of	7250na				
0230-0300 vl	Zambia, R Zambia/ZNBC 2	6165do				
0245-0300	India, All India Radio	3945do	6045do	7110do	11830do	
		15135do				
0245-0255 vl	Mozambique, R Mozambique	4855do	7242do			
0250-0300 sf	Greece, Voice of	6260na	7450na	9420na	9935na	
0250-0300	Vatican State, Vatican R	7305am	9605am			
0255-0300 vl	Zambia, R Zambia/ZNBC 1	4910do				

Selected Programs

Sundays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: Sports Report. See S 0106.
0211 Russia, Voice of: Moscow Mailbag. See S 0011.
0212 Germany, Deutsche Welle: Development Forum (biweekly). Reports and interviews on projects and progress in Africa and Asia.
0212 Germany, Deutsche Welle: Women on the Move (biweekly). A magazine promoting intercultural understanding and portraying the role of women in society.
0216 Germany, Deutsche Welle: Mailbag Asia. Listener mail from Asia is answered.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Your Top Tune. Win a prize by guessing which song of the three is the most popular.
0247 Russia, Voice of: You Write to Moscow. Listener letters are read, questions answered, and program announcements given.

Mondays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: Commentary. See S 1106.
0208 Germany, Deutsche Welle: Inside Europe. See S 0109.
0211 Russia, Voice of: Moscow Mailbag. See S 0011.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Timelines. See S 1632.
0233 Germany, Deutsche Welle: Headcrash (4). Wilfried Solbach with news about computers for PC, Apple, and Amiga techies.
0233 Germany, Deutsche Welle: Made in Germany (3). Iwe Hessler reports on new German products and business ideas.
0233 Germany, Deutsche Welle: MediaMag (2). Host Hardy Graupner reports on what's new in the fields of digital broadcasting, the Internet, and satellite technology.
0233 Germany, Deutsche Welle: Science and Technology (1). Magazine program presenting new developments in these fields.

Tuesdays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: NewsLink. See M 1106.
0211 Russia, Voice of: Newmarket. See M 1211.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Kaleidoscope. See S 1432.
0233 Germany, Deutsche Welle: Man and Environment. See T 0133.

Wednesdays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: NewsLink. See M 1106.
0211 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Your Top Tune. See S 0232.
0233 Germany, Deutsche Welle: Insight. See W 0133.
0247 Russia, Voice of: You Write to Moscow. See S 0247.

Thursdays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: NewsLink. See M 1106.
0211 Russia, Voice of: Moscow Mailbag. See S 0011.
0230 Russia, Voice of: News in Brief. See S 0030.
0230 UK, BBC London (AS): Stories for Life (3rd,10th). See T 1130.
0232 Russia, Voice of: Audio Book Club. See S 0032.
0233 Germany, Deutsche Welle: Living in Germany. See H 0133.

Fridays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: NewsLink. See M 1106.
0211 Russia, Voice of: Moscow Mailbag. See S 0011.
0230 Russia, Voice of: News in Brief. See S 0030.
0230 UK, BBC London (AF): Heritage (4th,11th,18th). See A 1101.
0232 Russia, Voice of: Russian by Radio. See S 0632.
0233 Germany, Deutsche Welle: Spotlight on Sport. Weekly magazine program with background stories and coverage of important events.

Saturdays

0200 Germany, Deutsche Welle: News. See S 0100.
0200 Russia, Voice of: News. See S 0000.
0206 Germany, Deutsche Welle: NewsLink. See M 1106.
0211 Russia, Voice of: Moscow Mailbag. See S 0011.
0230 Russia, Voice of: News in Brief. See S 0030.
0232 Russia, Voice of: Audio Book Club. See S 0032.
0233 Germany, Deutsche Welle: Economic Notebook. See A 0131.

Hauser's Highlights
KOREA SOUTH: Radio Korea Int'l

1030-1100 UTC on 11715 via Canada

Features at 1045:

Mon	*Globalizing Korea*
Tue	*Legacies of Korean Culture*
Wed	*Reaching Forward*
Thu	*Forward to Unification*
Fri	*Notes of Nostalgia*

At 1037 UTC:

Sat	*From Us to You*
Sun	*Shortwave Feedback*

(via Gigi Lytle, TX)

Frequencies

0300-0400	Anguilla,Caribbean Beacon	6090am			
0300-0400	Australia, Radio	13605pa	13755pa	15240pa	15365pa
		15415as	15510as	17750pa	17795pa
0300-0400 vl	Australia, VL8K Katherine	5025do			
0300-0400 vl	Australia, VL8T Tent Crk	4910do			
0300-0400 vl	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFCX Montreal	6005do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0400	China, China Radio Intl	9690na	9710na	11695na	
0300-0400 vl	Costa Rica,Faro del Carib	5055do			
0300-0400	Costa Rica,RF Peace Intl	6205am	7385am		
0300-0310	Croatia, Croatian Radio	5895na			
0300-0400	Cuba, Radio Havana	6000na	9820na	9830na	
0300-0327	Czech Rep, Radio Prague	5930as	7345as		
0300-0400	Ecuador, HCJB	9745am	21455am		
0300-0330	Egypt, Radio Cairo	9475na			
0300-0350	Germany, Deutsche Welle	6085na	6185na	9535na	9615na
		9640na			
0300-0400	Guatemala, Radio Cultural	3300do			
0300-0400	Japan, R Japan/NHK World	17685va			
0300-0400 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0300-0400	Lebanon, Voice of Hope	9960va			
0300-0400 vl	Lesotho, Radio Lesotho	4800do			
0300-0400 vl	Malaysia, RTM Kuching	7160do			
0300-0400 s	Malta, VO Mediterranean	15550as	17570au		
0300-0330	Mexico, Radio Mexico Intl	9705na			
0300-0325	Netherlands, Radio	9855as	11655as		
0300-0400	New Zealand, R NZ Intl	15115pa			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0330 vl	Philippines, R Pilipinas	11885as	15120as	15270as	
0300-0400	Russia,Voice of Russia WS	7125na	12000na	12010na	12050na
		13645na	13665na	15180na	15595na
0300-0330	S Africa, Channel Africa	5955af			
0300-0400	Sri Lanka, Sri Lanka BC	9730as			
0300-0400	Taiwan, VO Free China	5950na	7130as	9680na	11745au
		11825as	15345as		
0300-0330	Thailand, Radio	9655na	11890na	11905na	
0300-0400	Turkey, Voice of	7270as	7300eu	15190au	
0300-0315 mtwhf	Uganda, Radio	4976do			
0300-0400	Ukraine, R Ukraine Intl	7150na	9550na	12040na	
0300-0330	United Kingdom, BBC WS	5970sa	6135af	7325am	9895am
		15360as			
0300-0400	United Kingdom, BBC WS	3255af	5975am	6005af	6175na
		6180eu	6190af	6195va	9410eu
		9600af	9605as	9895am	11760as
		12095af	15310as	17790as	21660as
0300-0400	USA, KAIJ Dallas TX	5810am			
0300-0400	USA, KTBN Salt Lk City UT	7510am			
0300-0400	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510au			
0300-0400	USA, Monitor Radio Intl	5850na	7535af		
0300-0400	USA, Voice of America	6080af	6115af	7105af	7280af
		7290af	7340af	9575af	9885af
0300-0330 smtwh	USA, Voice of America	4960af			
0300-0400	USA, WEWN Birmingham AL	5825eu	6890na		
0300-0400	USA, WGTG McCaysville GA	5085am			
0300-0400	USA, WHRI Noblesville IN	5745am	17510am		
0300-0400	USA, WINB Red Lion PA	11950am			
0300-0400	USA, WJCR Upton KY	7490na			
0300-0400	USA, WRMI/R Miami Intl	9955am			
0300-0400	USA, WRNO New Orleans LA	7395am			
0300-0400	USA, WWCR Nashville TN	2390am	3215am	5070am	5935am
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0310	Vatican State, Vatican R	7305na	9605am		
0300-0400 vl	Zambia, R Zambia/ZNBC 1	4910do			
0300-0400 vl	Zambia, R Zambia/ZNBC 2	6165do			
0300-0400 vl	Zimbabwe, Zimbabwe BC	3396do			
0310-0340	Vatican State, Vatican R	7360af	9660af		
0330-0357	Czech Rep, Radio Prague	9480me	11600as		
0330-0355	Moldova, R Moldova Intl	7520na			
0330-0400 twhfa	Portugal, R Portugal Intl	6150am	9570am		
0330-0400	Slovakia, Adv World Radio	11610as			
0330-0400	Sweden, Radio	9430na			
0330-0400	Tanzania, Radio	5050af			
0330-0400	United Kingdom, BBC WS	9610af	11730af	11955as	15280as
0333-0400 mtw	S Africa, Trans World R	7215af			
0335-0355 vl	India, All India Radio	7110do	11830do	15135do	
0340-0350	Greece, Voice of	6260na	7450na	9420na	9935na
0345-0400	Burundi, Radio Nationale	6140do			
0345-0400	Tajikistan,Radio Dushanbe	4975as	9905as		
0345-0400 as	Uganda, Radio	4976do			
0356-0400	Zambia, Christian Voice	3330af	6065af		

Selected Programs

Sundays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: Sports Report. See S 0106.
0309 Germany, Deutsche Welle: Inside Europe. See S 0109.
0311 Russia, Voice of: News and Views. Russian views on news developments.
0325 Japan, NHK/Radio: Profile. See S 0025.
0330 Russia, Voice of: News in Brief. See S 0030.
0332 Russia, Voice of: Christian Message from Moscow. No details available about this new program.
0338 Germany, Deutsche Welle: Mailbag. See S 0138.

Mondays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: Commentary. See S 1106.
0308 Germany, Deutsche Welle: Arts on the Air. See S 1108.
0308 Germany, Deutsche Welle: Feature of the Month (1). See S 1108.
0311 Russia, Voice of: News and Views. See S 0311.
0315 Japan, NHK/Radio: 44 Minutes. See M 0015.
0332 Russia, Voice of: Audio Book Club. See S 0032.
0333 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: NewsLink. See M 1106.
0311 Russia, Voice of: News and Views. See S 0311.
0315 Japan, NHK/Radio: 44 Minutes. See M 0015.
0332 Russia, Voice of: Our Treasure Chest. No information available.
0333 Germany, Deutsche Welle: Man and Environment. See T 0133.
0345 UK, BBC London (AS): Red Hills of Home (1st,8th). See T 0030.

Wednesdays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: NewsLink. See M 1106.
0311 Russia, Voice of: News and Views. See S 0311.
0315 Japan, NHK/Radio: 44 Minutes. See M 0015.
0332 Russia, Voice of: Our Treasure Chest. See T 0332.
0333 Germany, Deutsche Welle: Insight. See W 0133.

Thursdays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: NewsLink. See M 1106.
0311 Russia, Voice of: News and Views. See S 0311.
0315 Japan, NHK/Radio: 44 Minutes. See M 0015.
0332 Russia, Voice of: Audio Book Club. See S 0032.
0333 Germany, Deutsche Welle: Living in Germany. See H 0133.

Fridays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: NewsLink. See M 1106.
0311 Russia, Voice of: News and Views. See S 0311.
0315 Japan, NHK/Radio: 44 Minutes. See M 0015.
0332 Russia, Voice of: Culture and the Arts. An overview of a Russian cultural activity.
0333 Germany, Deutsche Welle: Headcrash (4). See M 0233.
0333 Germany, Deutsche Welle: Made in Germany (3). See M 0233.
0333 Germany, Deutsche Welle: MediaMag (2). See M 0233.
0333 Germany, Deutsche Welle: Science and Technology (1). See M 0233.

Saturdays

0300 Germany, Deutsche Welle: News. See S 0100.
0300 Japan, NHK/Radio: News. See S 0000.
0300 Russia, Voice of: News. See S 0000.
0306 Germany, Deutsche Welle: NewsLink. See M 1106.
0310 Japan, NHK/Radio: This Week. A weekly variety show.
0311 Russia, Voice of: News and Views. See S 0311.
0330 Russia, Voice of: News in Brief. See S 0030.
0331 Germany, Deutsche Welle: Economic Notebook. See A 0131.
0332 Russia, Voice of: Russian History. A look back at a significant event in Russia's past.
0355 Japan, NHK/Radio: News Summary. A five-minute news wrap-up.

FREQUENCIES

0400-0500	Anguilla,Caribbean Beacon	6090am			
0400-0500	Australia, Radio	11880pa	13605as	15240pa	15365pa
		15415as	17750as	17795pa	
0400-0500 vl	Australia, VL8K Katherine	5025do			
0400-0500 vl	Australia, VL8T Tent Crk	4910do			
0400-0500	Bulgaria, Radio	9485na	11720na		
0400-0500 vl	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFCX Montreal	6005do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, R Canada Intl	9715me	11835me	15275me	
0400-0500	China, China Radio Intl	9560na	9730am		
0400-0500	Costa Rica,RF Peace Intl	6205am	7385am		
0400-0410	Croatia, Croatian Radio	5895na			
0400-0500	Cuba, Radio Havana	6000na	6180na	9820na	9830na
0400-0500 vl	Cyprus, BRT International	6150do			
0400-0500	Ecuador, HCJB	9745am	21455am		
0400-0450	Germany, Deutsche Welle	5990af	6015af	7225af	9565af
		11765af			
0400-0500 twhfa	Guatemala, Radio Cultural	3300do			
0400-0415	Israel, Kol Israel	7465na	9435na	17545af	
0400-0500 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0400-0500	Lebanon, Voice of Hope	9960va			
0400-0500 s	Malta, VO Mediterranean	15550as	17570au		
0400-0430 m-a/vl	Mexico, Radio Mexico Intl	9705na			
0400-0458	New Zealand, R NZ Intl	15115pa			
0400-0450	North Korea, R Pyongyang	15180as	15230as	17765as	
0400-0430 m	Norway, Radio Norway Intl	7485na			
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0456	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na	12990na		
0400-0500	Russia,Voice of Russia WS	12000na	12010na	12050na	13645na
		13665na	15180na	15445na	15595na
0400-0430	S Africa, Channel Africa	5955af			
0400-0404 mtw	S Africa, Trans World R	7215af			
0400-0430	Sri Lanka, Sri Lanka BC	9730as			
0400-0430	Switzerland, Swiss R Intl	6135na	9885na		
0400-0500	Switzerland, Swiss R Intl	9905ca			
0400-0430	Tanzania, Radio	5050af			
0400-0500	Turkey, Voice of	7340na			
0400-0415	Uganda, Radio	4976do			
0400-0500	United Kingdom, BBC WS	3255af	3955eu	5975af	6005af
		6175am	6180eu	6190af	6195eu
		7160af	9410na	9600af	11760va
		11955as	12085af	12095va	15280as
		15310as	15575va	17640af	17790as
		21660as			
0400-0430	United Kingdom, BBC WS	9605as	9610af	9895am	11730af
0400-0500	USA, KAIJ Dallas TX	5810am			
0400-0500	USA, KTBN Salt Lk City UT	7510am			
0400-0500	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	USA, Monitor Radio Intl	7535eu	9840af		
0400-0500	USA, Voice of America	6080af	7170af	7265af	7280af
		7290af	9575af	9885af	11965me
		15205va			
0400-0500	USA, WEWN Birmingham AL	5825eu	6890na		
0400-0500	USA, WGTG McCaysville GA	5085am			
0400-0500	USA, WHRI Noblesville IN	5745am	17780am		
0400-0500	USA, WINB Red Lion PA	11950am			
0400-0500	USA, WJCR Upton KY	7490na			
0400-0500 smtwhf	USA, WMLK Bethel PA	9465eu			
0400-0500	USA, WRNO New Orleans LA	7395am			
0400-0500	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0400-0500	USA, WYFR Okeechobee FL	6065na	9505na	9985eu	
0400-0430	Vietnam, Voice of	12020na	15010na		
0400-0500	Zambia, Christian Voice	3330af	6065af		
0400-0500 vl	Zambia, R Zambia/ZNBC 1	4910do			
0400-0500 vl	Zambia, R Zambia/ZNBC 2	6165do			
0400-0500 vl	Zimbabwe, Zimbabwe BC	3396do			
0415-0500 vl	Malawi, MBC	5993do			
0425-0440 vl	Italy, RAI Intl	5975eu	7270eu		
0425-0500	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0430-0500	Australia,DefenseForces R	13525as			
0430-0459	Austria, R Austria Intl	6155eu	13730eu		
0430-0500 m-f/vl	Lesotho, Radio Lesotho	4800do			
0430-0455	Moldova, R Moldova Intl	7520na			
0430-0500	Netherlands, Radio	6165na	9590na		
0430-0500	Serbia, Radio Yugoslavia	9580na	11870na		
0430-0500	Swaziland, Trans World R	3200af	4775af	6100af	
0430-0500	United Kingdom, BBC WS	15420af			
0455-0500	Malaysia, Voice of	6175as	9750as	15295au	
0459-0500	New Zealand, R NZ Intl	9795pa			

SELECTED PROGRAMS

Sundays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: Sports Report. See S 0106.
0409 Germany, Deutsche Welle: Inside Europe. See S 0109.
0411 Russia, Voice of: Program Preview. A review of programs to be featured in the coming week.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Moscow Yesterday and Today. Sit back and enjoy a great program about Russian history with magnificent sound effects.
0433 Germany, Deutsche Welle: Religion and Society. News and developments concerning the world's major religions.
0438 Germany, Deutsche Welle: Hits in Germany. The German pop scene for listeners in Africa.

Mondays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: Commentary. See S 1106.
0408 Germany, Deutsche Welle: Inside Europe. See S 0109.
0411 Russia, Voice of: Program Preview. See S 0411.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: The Jazz Show. The world of Russian jazz.
0437 Germany, Deutsche Welle: Good Morning Africa. Music, gossip and listeners' messages for and from Africa.

Tuesdays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: NewsLink. See M 1106.
0411 Russia, Voice of: Commonwealth Update. See T 0111.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Yours for the Asking. See M 2332.
0433 Germany, Deutsche Welle: Good Morning Africa. See M 0437.

Wednesdays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: NewsLink. See M 1106.
0411 Russia, Voice of: Commonwealth Update. See T 0111.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Music at Your Request. See M 1132.
0433 Germany, Deutsche Welle: Good Morning Africa. See M 0437.

Thursdays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: NewsLink. See M 1106.
0411 Russia, Voice of: Commonwealth Update. See T 0111.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Folk Box. See S 2332.
0433 Germany, Deutsche Welle: Good Morning Africa. See M 0437.

Fridays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: NewsLink. See M 1106.
0411 Russia, Voice of: Commonwealth Update. See T 0111.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Kaleidoscope. See S 1432.
0433 Germany, Deutsche Welle: Good Morning Africa. See M 0437.

Saturdays

0400 Germany, Deutsche Welle: News. See S 0100.
0400 Russia, Voice of: News. See S 0000.
0406 Germany, Deutsche Welle: NewsLink. See M 1106.
0411 Russia, Voice of: Commonwealth Update. See T 0111.
0430 Russia, Voice of: News in Brief. See S 0030.
0432 Russia, Voice of: Timelines. See S 1632.
0433 Germany, Deutsche Welle: Economic Notebook. See A 0131.

MT MONITORING TEAM

Next Reporting Deadline: July 23, 1997

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THANK YOU ...

ADDITIONAL CONTRIBUTORS TO THIS MONTH'S SHORTWAVE GUIDE:

Mark J. Fine, Remington, VA; Bob Fraser, Cohasset, MA;Frank Hillton, Charleston, SC;Loyd Van Horn, Brasstown, NC;Alden C. Wires Jr., East Point, GA; BBCMS; BBC *Summary of World Broadcasts*; *BBC On-Air*; Internet Shortwave Newsgroups; NASWA *Journal*; Cumbre DX.

Frequencies

0500-0600	Anguilla,Caribbean Beacon	6090am			
0500-0600	Australia, Radio	13605as	15510as	15530as	17795pa
0500-0600 vl	Australia, VL8K Katherine	5025do			
0500-0600 vl	Australia, VL8T Tent Crk	4910do			
0500-0600	Australia,DefenseForces R	13525as			
0500-0600 vl	Cameroon, Radio Cameroon	4850do			
0500-0600	Canada, CFCX Montreal	6005do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0530 mtwhf	Canada, R Canada Intl	6050eu	7295af	11835af	15430me
0500-0600	Costa Rica, Adv World R	5030ca	6150ca	9725ca	
0500-0600 as	Costa Rica, Adv World R	7375am			
0500-0600	Costa Rica,RF Peace Intl	6205am	7385am		
0500-0600	Cuba, Radio Havana	6000na	9830na		
0500-0600	Ecuador, HCJB	9745am	21455am		
0500-0550	Germany, Deutsche Welle	5960na	6045na	6120na	6145na
		6185na	9615na	9650na	
0500-0600	Guyana, GBC/Voice of	3290do			
0500-0600 vl	Italy, IRRS	3985va			
0500-0530 vl	Italy, IRRS	7125va			
0500-0600	Japan, R Japan/NHK World	6110na	7230eu	11840as	11895eu
		11920na	13630		
0500-0530	Japan, R Japan/NHK World	13630na	15230na		
0500-0600 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0500-0600	Lebanon, Voice of Hope	9960va			
0500-0505	Lesotho, Radio Lesotho	4800do			
0500-0600	Liberia,LCN/R Liberia Int	5100do			
0500-0510 mtwhf	Malawi, MBC	3380do			
0500-0600	Malaysia, Voice of	6175as	9750as	15295au	
0500-0525	Netherlands, Radio	5995na	6165na	9590na	
0500-0600	New Zealand, R NZ Intl	9795pa			
0500-0505	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0500-0600	Nigeria, Voice of	7255af			
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	12000na	12010na	12040na	12050na
		13645na	13665na	15595na	
0500-0530	S Africa, Channel Africa	9675af			
0500-0556	Spain, R Exterior Espana	6055am			
0500-0515	Uganda, Radio	4976do			
0500-0600	United Kingdom, BBC WS	3255af	3955eu	5975am	6005af
		6175am	6180eu	6190af	6195va
		7120va	7160af	9410va	9600af
		9610af	9740as	11760as	12095as
		15310as	15360as	15420af	15575va
		17640af	17760as	17885af	21660as
0500-0530	United Kingdom, BBC WS	15280as	17790as		
0500-0600	USA, KAIJ Dallas TX	5810am			
0500-0600	USA, KTBN Salt Lk City UT	7510am			
0500-0600	USA, KVOH Los Angeles CA	9975am			
0500-0600	USA, KWHR Naalehu HI	9930as			
0500-0600	USA, Monitor Radio Intl	7535eu			
0500-0600	USA, Voice of America	5970af	6035af	6080af	7170va
		7195af	9630af	11965me	12080af
		15205va			
0500-0600	USA, WGTG McCaysville GA	5085am			
0500-0600	USA, WHRI Noblesville IN	5745am	17780am		
0500-0600	USA, WJCR Upton KY	7490na			
0500-0600 smtwhf	USA, WMLK Bethel PA	9465eu			
0500-0600	USA, WRNO New Orleans LA	7355am			
0500-0600	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0500-0600	USA, WYFR Okeechobee FL	5985na	9985af	11580eu	
0500-0530	Vatican State, Vatican R	9660af	11625af		
0500-0520	Vatican State, Vatican R	4005eu	5882eu	7250eu	
0500-0600	Zambia, Christian Voice	3330af	6065af		
0500-0530 vl	Zambia, R Zambia/ZNBC 1	4910do			
0500-0600 vl	Zambia, R Zambia/ZNBC 2	6165do			
0500-0530 vl	Zimbabwe, Zimbabwe BC	3396do			
0505-0600	Swaziland, Trans World R	3200af	4775af	6070af	9500af
0525-0600	Ghana, Ghana Broadc Corp	3366do	4915do		
0530-0559	Austria, R Austria Intl	6015na			
0530-0600 vl	Kiribati, Radio	9810do			
0530-0556	Romania, R Romania Intl	11790af	11940af	15250af	15270af
		15340as	17720as	17790af	
0530-0600	Thailand, Radio	9655eu	11905eu	15115eu	
0530-0600 vl	Zambia, R Zambia/ZNBC 1	7220do			
0530-0600 vl	Zimbabwe, Zimbabwe BC	5975do			

Selected Programs

Sundays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: News. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0506 Germany, Deutsche Welle: Sports Report. See S 0106.
0509 Germany, Deutsche Welle: Inside Europe. See S 0109.
0510 Japan, NHK/Radio: Hello from Tokyo. See S 0110.
0511 Russia, Voice of: Science and Engineering in the Commonwealth. The latest developments in science and technology.
0532 Russia, Voice of: This is Russia. A program which helps you to get to know Russia, the Russians, and it's ethnic minorities better.
0538 Germany, Deutsche Welle: Mailbag. See S 0138.

Mondays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: Dateline Japan. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0506 Germany, Deutsche Welle: Commentary. See S 1106.
0508 Germany, Deutsche Welle: Arts on the Air. See S 1108.
0508 Germany, Deutsche Welle: Feature of the Month (1). See S 1108.
0511 Russia, Voice of: Moscow Mailbag. See S 0011.
0515 Japan, NHK/Radio: Asian Top News. See M 0115.
0525 Japan, NHK/Radio: Sound of Asia. See M 0125.
0525 Japan, NHK/Radio: Tokyo Pop-In. A sample of the Japanese music scene.
0530 UK, BBC London (AS): Living Together (30th,7th,14th). See M 0130.
0532 Russia, Voice of: This is Russia. See S 0532.
0533 Germany, Deutsche Welle: German by Radio. See S 1133.

Tuesdays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: Dateline Japan. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0506 Germany, Deutsche Welle: NewsLink. See M 1106.
0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0515 Japan, NHK/Radio: Asian Top News. See M 0115.
0525 Japan, NHK/Radio: Tokyo Pop-In. See M 0525.
0532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0533 Germany, Deutsche Welle: Man and Environment. See T 0133.

Wednesdays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: Dateline Japan. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0506 Germany, Deutsche Welle: NewsLink. See M 1106.
0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0515 Japan, NHK/Radio: Asian Top News. See M 0115.
0525 Japan, NHK/Radio: Music Reflections. See W 0125.
0525 Japan, NHK/Radio: Tokyo Pop-In. See M 0525.
0532 Russia, Voice of: This is Russia. See S 0532.
0533 Germany, Deutsche Welle: Insight. See W 0133.

Thursdays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: Dateline Japan. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0506 Germany, Deutsche Welle: NewsLink. See M 1106.
0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0515 Japan, NHK/Radio: Asian Top News. See M 0115.
0525 Japan, NHK/Radio: Tokyo Pop-In. See M 0525.
0530 UK, BBC London (AS): Heritage (3rd,10th,17th). See A 1101.
0532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0533 Germany, Deutsche Welle: Living in Germany. See H 0133.

Fridays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: Dateline Japan. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0506 Germany, Deutsche Welle: NewsLink. See M 1106.
0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0515 Japan, NHK/Radio: Asian Top News. See M 0115.
0525 Japan, NHK/Radio: Music Beat. See F 0125.
0525 Japan, NHK/Radio: Tokyo Pop-In. See M 0525.
0532 Russia, Voice of: This is Russia. See S 0532.
0533 Germany, Deutsche Welle: Headcrash (1). See M 0233.
0533 Germany, Deutsche Welle: Made in Germany (4). See M 0233.
0533 Germany, Deutsche Welle: MediaMag (3). See M 0233.
0533 Germany, Deutsche Welle: Science and Technology (2). See M 0233.

Saturdays

0500 Germany, Deutsche Welle: News. See S 0100.
0500 Japan, NHK/Radio: News. See S 0000.
0500 Russia, Voice of: News. See S 0000.
0509 Germany, Deutsche Welle: Sports Report. See S 0106.
0510 Japan, NHK/Radio: Asia Weekly. See A 0110.
0510 Japan, NHK/Radio: Asia Weekly. See A 0110.
0511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
0512 Germany, Deutsche Welle: Focus on Development (biweekly). Reports and interviews on projects and progress in Africa and Asia.
0512 Germany, Deutsche Welle: Women on the Move (biweekly). See S 0212.
0530 UK, BBC London (AS): Stories for Life (28th,5th). See T 1130.
0532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0533 Germany, Deutsche Welle: Economic Notebook. See A 0131.

Frequencies

0600-0700	Anguilla,Caribbean Beacon	6090am			
0600-0700	Australia, Radio	13605as	15415as	15530as	17750as
0600-0630	Australia, Radio	11880pa	17795pa		
0600-0700 vl	Australia, VL8K Katherine	5025do			
0600-0700 vl	Australia, VL8T Tent Crk	4910do			
0600-0633	Australia,DefenseForces R	13525as			
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFCX Montreal	6005do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0700	Costa Rica,RF Peace Intl	6205am	7385am		
0600-0700	Cuba, Radio Havana	6000na	9820na	9830na	
0600-0700	Ecuador, HCJB	9745am	21455am		
0600-0650	Germany, Deutsche Welle	11915af	13790af	15185af	17820as
		17860af	21680af		
0600-0615	Ghana, Ghana Broadc Corp	3366do	4915do		
0600-0700	Guyana, GBC/Voice of	3290do			
0600-0700 vl	Italy, IRRS	3985va			
0600-0700	Japan, R Japan/NHK World	5975eu	7230eu	9835as	11740as
		11840as	11910am	11920na	12030as
		15230na	15550va	17810as	
0600-0700 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0600-0700 vl	Kiribati, Radio	9810do			
0600-0700	Lebanon, Voice of Hope	9960va			
0600-0700	Liberia,LCN/R Liberia Int	5100do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295au	
0600-0700	New Zealand, R NZ Intl	9795pa			
0600-0630	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0600-0700	Nigeria, Voice of	7255af			
0600-0650	North Korea, R Pyongyang	15180as	15230as		
0600-0630 s	Norway, Radio Norway Intl	7180eu	7295pa	9590af	13805af
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0700	Russia,Voice of Russia WS	12000au	12010as	12040as	12050as
		12070as	13645pa	13665pa	15470pa
		15490pa	15560va	15580va	15595va
		17570au	17580au	17610au	17610pa
		17795va			
0600-0630	S Africa, Channel Africa	11900af			
0600-0657	S Africa, Trans World R	11730af			
0600-0610	Sierra Leone, SLBS	3316do			
0600-0630	Slovakia, Adv World Radio	11640af			
0600-0630 vl	Solomon Islands, SIBC	5020do	9545do		
0600-0700	United Kingdom, BBC WS	5975am	6005af	6175am	6180eu
		6190af	6195eu	7145as	7160af
		7325va	9410va	9600af	9740as
		11760as	11780eu	11940af	12095eu
		15310as	15360as	15420af	15565va
		15575va	17640af	17785as	17885af
		21660as			
0600-0700	USA, KAIJ Dallas TX	5810am			
0600-0700	USA, KTBN Salt Lk City UT	7510am			
0600-0700	USA, KVOH Los Angeles CA	9975am			
0600-0700	USA, KWHR Naalehu HI	9930as			
0600-0700	USA, Monitor Radio Intl	7535eu			
0600-0630	USA, Voice of America	5970af	5995af	6035af	6080af
		7170va	7195af	9630af	11805af
		11950af	11965me	12080af	15205va
0600-0700	USA, WEWN Birmingham AL	5825eu	6890na	9370na	
0600-0700	USA, WHRI Noblesville IN	5745am	17780am		
0600-0700	USA, WJCR Upton KY	7490na			
0600-0700 smtwhf	USA, WMLK Bethel PA	9465eu			
0600-0700	USA, WRNO New Orleans LA	7355am			
0600-0700	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0600-0700	USA, WYFR Okeechobee FL	5985am	7355eu	9985eu	
0600-0630	Vietnam, Voice of	5925as	10060as		
0600-0700	Yemen, Yemeni Rep Radio	9780do			
0600-0700	Zambia, Christian Voice	3330af	6065af		
0600-0700 vl	Zambia, R Zambia/ZNBC 1	7220do			
0600-0700 vl	Zimbabwe, Zimbabwe BC	5975do			
0605-0700	Swaziland, Trans World R	4775af	6100af	9500af	9650af
0630-0700	Belgium, R Vlaanderen Int	6035eu	9925eu	9940au	
0630-0700	Georgia, Radio	11805eu			
0630-0658	Vatican State, Vatican R	11625af	13765af	15570af	
0631-0640	Romania, R Romania Intl	9550eu	9665eu	11810eu	15365eu
0645-0700 as	Monaco, Trans World Radio	9755eu			
0645-0700	Romania, R Romania Intl	11740pa	11840pa	15250pa	15270pa
		17720pa			
0655-0700 mtwhf	Monaco, Trans World Radio	9755eu			

Selected Programs

Sundays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0606 Germany, Deutsche Welle: Sports Report. See S 0106.
0609 Germany, Deutsche Welle: Inside Europe. See S 0109.
0611 Russia, Voice of: Moscow Mailbag. See S 0011.
0625 Japan, NHK/Radio: Profile. See S 0025.
0633 Germany, Deutsche Welle: Religion and Society. See S 0433.
0635 Belgium, R Vlaanderen Intl: Radio World. Updates to international broadcasting schedules.
0638 Germany, Deutsche Welle: Hits in Germany. See S 0438.
0645 Belgium, R Vlaanderen Intl: PO Box 26. Listener letters are read and answered in this mailbox program.

Mondays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0608 Germany, Deutsche Welle: Inside Europe. See S 0109.
0611 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
0615 Japan, NHK/Radio: 44 Minutes. See M 0015.
0620 Japan, NHK/Radio: Guest Interview. Asia Weekly
0635 Belgium, R Vlaanderen Intl: Press Review. Stories on the front pages of the day's papers.
0637 Germany, Deutsche Welle: Good Morning Africa. See M 0437.
0638 Japan, NHK/Radio: News Commentary. An editorial opinion on the current news.
0641 Belgium, R Vlaanderen Intl: Belgium Today. Current affairs in Belgium.
0645 Belgium, R Vlaanderen Intl: The Arts. Cultural events in the news.
0651 Belgium, R Vlaanderen Intl: Tourism. Take an audio tour of the sights and sounds of Belgium.
0651 Japan, NHK/Radio: Tumbling Dice. Focus on a topic of interest in Japan.

Tuesdays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0608 Germany, Deutsche Welle: NewsLink. See M 1106.
0611 Russia, Voice of: Newmarket. See M 1211.
0615 Japan, NHK/Radio: 44 Minutes. See M 0015.
0632 Russia, Voice of: This is Russia. See S 0532.
0633 Germany, Deutsche Welle: Good Morning Africa. See M 0437.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0639 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0646 Belgium, R Vlaanderen Intl: Focus on Europe. See M 2344.
0650 Belgium, R Vlaanderen Intl: Sports Report. See M 2349.

Wednesdays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0608 Germany, Deutsche Welle: NewsLink. See M 1106.
0611 Russia, Voice of: Moscow Mailbag. See S 0011.
0615 Japan, NHK/Radio: 44 Minutes. See M 0015.
0632 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0633 Germany, Deutsche Welle: Good Morning Africa. See M 0437.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0639 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0646 Belgium, R Vlaanderen Intl: Living in Belgium. See T 2345.
0650 Belgium, R Vlaanderen Intl: Green Society. See T 2349.

Thursdays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0608 Germany, Deutsche Welle: NewsLink. See M 1106.
0611 Russia, Voice of: Newmarket. See M 1211.
0615 Japan, NHK/Radio: 44 Minutes. See M 0015.
0632 Russia, Voice of: This is Russia. See S 0532.
0633 Germany, Deutsche Welle: Good Morning Africa. See M 0437.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0639 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0644 Belgium, R Vlaanderen Intl: Around Town. See W 2344.
0649 Belgium, R Vlaanderen Intl: The Arts. See M 0645.

Fridays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0608 Germany, Deutsche Welle: NewsLink. See M 1106.
0611 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
0615 Japan, NHK/Radio: 44 Minutes. See M 0015.
0632 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
0633 Germany, Deutsche Welle: Good Morning Africa. See M 0437.
0636 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0641 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
0646 Belgium, R Vlaanderen Intl: International Report. See H 2344.
0649 Belgium, R Vlaanderen Intl: Economics. See H 2349.

Saturdays

0600 Germany, Deutsche Welle: News. See S 0100.
0600 Japan, NHK/Radio: News. See S 0000.
0600 Russia, Voice of: News. See S 0000.
0608 Germany, Deutsche Welle: NewsLink. See M 1106.
0610 Japan, NHK/Radio: Weekend Break. See M 0125.
0611 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
0632 Russia, Voice of: This is Russia. See S 0532.
0633 Germany, Deutsche Welle: Economic Notebook. See A 0131.
0635 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
0640 Belgium, R Vlaanderen Intl: Music from Flanders. The weekly concert.

FREQUENCIES

0700-0800	Anguilla,Caribbean Beacon	6090am			
0700-0800	Australia, Radio	9580pa	9860pa	12080pa	13605as
		15240pa	15365pa	15415as	15530as
		17750as			
0700-0800 vl	Australia, VL8K Katherine	5025do			
0700-0800 vl	Australia, VL8T Tent Crk	4910do			
0700-0800	Canada, CFCX Montreal	6005do			
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	6205am	7385am		
0700-0727	Czech Rep, Radio Prague	7345eu	9505eu		
0700-0800	Ecuador, HCJB	9645pa	21455au		
0700-0800 as	Eqt Guinea, R East Africa	15186af			
0700-0800 mtwhf	Eqt Guinea, Radio Africa	15186af			
0700-0715	Ghana, Ghana Broadc Corp	3366do	4915do		
0700-0800	Guyana, GBC/Voice of	3290do			
0700-0800 vl	Italy, IRRS	3985va			
0700-0800	Japan, R Japan/NHK World	7230eu	11740as	11840as	11850pa
		11910as	11920as	15230me	17810va
		17815af			
0700-0800 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
0700-0800 vl	Kiribati, Radio	9810do			
0700-0800	Lebanon, Voice of Hope	9960va			
0700-0715	Liberia,LCN/R Liberia Int	5100do			
0700-0800 asmtwh	Malaysia, Radio	7295do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295au	
0700-0800	Monaco, Trans World Radio	9755eu			
0700-0758 as	New Zealand, R NZ Intl	9795pa			
0700-0800 mtwhf	New Zealand, R NZ Intl	9795pa			
0700-0800	Nigeria, Voice of	7255af			
0700-0750	North Korea, R Pyongyang	15340af	17765me		
0700-0730 s	Norway, Radio Norway Intl	15245me			
0700-0800 vl	Papua New Guinea, NBC	9675do			
0700-0745	Romania, R Romania Intl	15370pa	17720pa	17790pa	17805pa
0700-0715 s	Romania, R Romania Intl	15370pa	17720pa	17790pa	17805pa
0700-0800	Russia,Voice of Russia WS	15470pa	15490pa	15560va	17570au
		17610au	17795va		
0700-0710	Sierra Leone, SLBS	3316do			
0700-0730	Slovakia, Adv World Radio	9440eu			
0700-0800 vl	Solomon Islands, SIBC	5020do	9545do		
0700-0800	Swaziland, Trans World R	9650af			
0700-0800	Taiwan, VO Free China	5950na			
0700-0800	United Kingdom, BBC WS	6190af	7145as	7325eu	9410eu
		9600af	9610af	9740as	11760as
		11835af	11940af	11955as	12095va
		15310as	15360as	15485af	15575va
		17640af	17760af	17785as	17830af
		21660as			
0700-0800 as	United Kingdom, BBC WS	17885af			
0700-0715	United Kingdom, BBC WS	6005af	7160af		
0700-0730	United Kingdom, BBC WS	6180eu	6195eu	7325af	9410eu
		11780eu			
0700-0800	USA, KAIJ Dallas TX	5810am			
0700-0800	USA, KTBN Salt Lk City UT	7510am			
0700-0800	USA, KWHR Naalehu HI	9930au			
0700-0800	USA, Monitor Radio Intl	7535eu			
0700-0800	USA, WEWN Birmingham AL	5825eu	6890na		
0700-0800	USA, WHRI Noblesville IN	5745am	17780am		
0700-0800	USA, WJCR Upton KY	7490na			
0700-0800 smtwhf	USA, WMLK Bethel PA	9465eu			
0700-0800	USA, WRNO New Orleans LA	7355am			
0700-0800	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0700-0800	USA, WYFR Okeechobee FL	7355eu	9985eu	13695af	
0700-0800 vl	Vanuatu, Radio	3945do	7260do		
0700-0800	Zambia, Christian Voice	6065af			
0700-0800 vl	Zambia, R Zambia/ZNBC 1	7220do			
0700-0800 vl	Zimbabwe, Zimbabwe BC	5975do			
0730-0755	Austria, R Austria Intl	6155eu	13730eu	15410me	17870me
0730-0800	Ecuador, HCJB	5865eu			
0730-0745 s	Greece, Voice of	7430eu	7450eu	9425eu	11645eu
0730-0735	India, All India Radio	15185do	15260do		
0730-0800	Netherlands, Radio	9720pa	9820pa		
0730-0800 as	Palau, KHBN/Voice of Hope	9730as			
0730-0800	United Kingdom, BBC WS	15400va	15565va		
0740-0800	Guam, TWR/KTWR	15200as			
0745-0800 s	Ghana, Ghana Broadc Corp	3366do	4915do		
0745-0755	Greece, Voice of	7430eu	9425au	11645eu	
0758-0800 as	New Zealand, R NZ Intl	6100pa			

0800-0900	Anguilla,Caribbean Beacon	6090am			
0800-0900	Australia, Radio	5995pa	6020pa	6080pa	9710pa
		9860pa	12080pa	13605pa	21725as
0800-0830	Australia, Radio	15415as	17715pa	17880as	
0800-0830 vl	Australia, VL8K Katherine	5025do			
0800-0830 vl	Australia, VL8T Tent Crk	4910do			
0800-0900	Bhutan, Bhutan BC Service	6030do			
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFCX Montreal	6005do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica,RF Peace Intl	6205am	7385am		
0800-0900	Ecuador, HCJB	5865eu	9645pa	21455au	
0800-0900 as	Eqt Guinea, R East Africa	15186af			
0800-0900 mtwhf	Eqt Guinea, Radio Africa	15186af			
0800-0830	Finland, YLE/R Finland	13645as	15235au		
0800-0805 s	Ghana, Ghana Broadc Corp	3366do			
0800-0900	Guam, TWR/KTWR	15200as			
0800-0900	Guyana, GBC/Voice of	3290do			
0800-0900	Indonesia, Voice of	9525as			
0800-0900 vl	Italy, IRRS	7125va			
0800-0900 vl	Kiribati, Radio	9810do			
0800-0900	Lebanon, Voice of Hope	9960va			
0800-0900	Liberia,LCN/R Liberia Int	5100do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295au	
0800-0835 a	Monaco, Trans World Radio	9755eu			
0800-0850 s	Monaco, Trans World Radio	9755eu			
0800-0820 mtwhf	Monaco, Trans World Radio	9755eu			
0800-0825	Netherlands, Radio	9720pa	9820pa		
0800-0816 mtwhf	New Zealand, R NZ Intl	9795pa			
0800-0850	North Korea, R Pyongyang	15180as	15230as		
0800-0830 s	Norway, Radio Norway Intl	15625as			
0800-0805	Pakistan, Radio	15465eu	17865eu		
0800-0900 as	Palau, KHBN/Voice of Hope	9730as			
0800-0900 vl	Papua New Guinea, NBC	9675do			
0800-0900	Russia,Voice of Russia WS	9810as	11800as	15470pa	15490pa
		15560va	17610au	17795va	
0800-0900 f	Seychelles, FEBA Radio	15540as			
0800-0810	Sierra Leone, SLBS	3316do			
0800-0900 vl	Solomon Islands, SIBC	5020do	9545do		
0800-0900	South Korea, R Korea Intl	9570au	13670eu		
0800-0805	Swaziland, Trans World R	4775af	9500af	9650af	
0800-0900	United Kingdom, BBC WS	6190af	7325eu	9410eu	9740as
		11750as	11760as	11940af	11955as
		12095eu	15310as	15360va	15400af
		15485va	15575va	17640va	17760as
		17785as	17830af	21660as	
0800-0900 as	United Kingdom, BBC WS	15565va	17885af		
0800-0815	United Kingdom, BBC WS	7145pa	11835af		
0800-0900	USA, KAIJ Dallas TX	5810am			
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTBN Salt Lk City UT	7510am			
0800-0900	USA, KWHR Naalehu HI	9930as			
0800-0900	USA, Monitor Radio Intl	7535eu	9845eu	11550pa	15665eu
0800-0900	USA, WEWN Birmingham AL	5825eu	5960na		
0800-0900	USA, WHRI Noblesville IN	5745am	9930am		
0800-0900	USA, WJCR Upton KY	7490na			
0800-0900	USA, WRNO New Orleans LA	7355am			
0800-0900 as	USA, WVHA Greenbush ME	13825af			
0800-0900	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0800-0830 vl	Vanuatu, Radio	3945do	7260do		
0800-0900	Zambia, Christian Voice	6065af			
0800-0900 vl	Zambia, R Zambia/ZNBC 1	7220do			
0800-0900 vl	Zimbabwe, Zimbabwe BC	5975do			
0815-0900 mtwtf	Nigeria, FRCN/Radio	3326do	4770do	4990do	
0816-0900 mtwhf	New Zealand, R NZ Intl	6100pa			
0820-0900 vl	Chile, R Esperanza	6089am			
0830-0900 s	Armenia, Voice of	15270eu			
0830-0900 vl	Australia, VL8A Alice Spg	2310do			
0830-0900 vl	Australia, VL8K Katherine	2485do			
0830-0900 vl	Australia, VL8T Tent Crk	2325do			
0830-0900	Georgia, Radio	11910eu			
0830-0840	India, All India Radio	7250do	15185do	15260do	
0830-0900	Lithuania, Radio Vilnius	9710eu			
0830-0900	Netherlands, Radio	9720pa	9820pa		
0830-0900	Slovakia, R Slovakia Intl	11990au	15460au	17570au	
0830-0900	United Kingdom, BBC WS	15280as			
0850-0853 s	Russia, R Pacific Ocean	7185as			
0855-0900	Guam, TWR/KTWR	11830au			

FREQUENCIES

0900-1000	Anguilla,Caribbean Beacon	6090am			
0900-1000	Australia, Radio	9860pa	13605as	21725as	
0900-1000 vl	Australia, VL8A Alice Spg	2310do			
0900-1000 vl	Australia, VL8K Katherine	2485do			
0900-1000 vl	Australia, VL8T Tent Crk	2325do			
0900-0925	Belgium, R Vlaanderen Int	6035eu	7190eu		
0900-1000	Canada, CFCX Montreal	6005do			
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-0935 vl	Chile, R Esperanza	6089am			
0900-1000	China, China Radio Intl	9785pa	11755pa		
0900-1000	Costa Rica,RF Peace Intl	6205am	7385am		
0900-0927	Czech Rep, Radio Prague	15640me	17485af		
0900-1000	Ecuador, HCJB	9645pa	21455au		
0900-0930	Ecuador, HCJB	5865eu			
0900-1000 as	Eqt Guinea, R East Africa	15186af			
0900-1000 mtwhf	Eqt Guinea, Radio Africa	15186af			
0900-0950	Germany, Deutsche Welle	6160au	9565af	12025af	15410af
		17715au	17800af	21600af	21680au
0900-0915 mtwtf	Ghana, Ghana Broadc Corp	3366do	4915do		
0900-0915	Guam, TWR/KTWR	11830as			
0900-1000	Guyana, GBC/Voice of	3290do			
0900-0930 vl/m-f	Italy, IRRS	7125va			
0900-0930 vl	Kiribati, Radio	9810do			
0900-1000	Lebanon, Voice of Hope	9960va			
0900-0915	Liberia,LCN/R Liberia Int	5100do			
0900-1000	Malaysia, Radio	7295do			
0900-0930	Mongolia, Voice of	15170as			
0900-0925	Netherlands, Radio	9720pa	9820au	13700pa	
0900-1000	New Zealand, R NZ Intl	6100pa			
0900-0930 s	Norway, Radio Norway Intl	13800as	15625au		
0900-1000 as	Palau, KHBN/Voice of Hope	9730as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia,Voice of Russia WS	9810as	11800as	11880as	17610au
		17795va			
0900-1000	Slovakia, Adv World Radio	9450eu			
0900-0930	Switzerland, Swiss R Intl	9885pa	13685pa	17515au	
0900-1000	United Kingdom, BBC WS	5965as	6190af	6195as	9410eu
		9740as	11750as	11765va	11940af
		11945as	12095eu	15190sa	15360as
		15400af	15485va	15565as	15575va
		17640va	17705eu	17830af	21660as
0900-0915	United Kingdom, BBC WS	7325eu	15310as	15360pa	17785as
0900-0945	United Kingdom, BBC WS	9580as	11760as	11955as	15280as
0900-1000	USA, KAIJ Dallas TX	5810am			
0900-1000	USA, KTBN Salt Lk City UT	7510am			
0900-1000	USA, Monitor Radio Intl	7395sa	7535eu	13840au	15665as
0900-1000	USA, WEWN Birmingham AL	5960na			
0900-1000	USA, WGTG McCaysville GA	9400am			
0900-1000	USA, WHRI Noblesville IN	5745am	7315am	9930am	
0900-1000	USA, WJCR Upton KY	7490na			
0900-1000 as	USA, WRMI/R Miami Intl	9955am			
0900-1000	USA, WRNO New Orleans LA	7355am			
0900-1000 as	USA, WVHA Greenbush ME	13825af			
0900-1000	USA, WWCR Nashville TN	2390am	3210am	5070am	5935am
0900-1000	Zambia, Christian Voice	6065af			
0900-1000 vl	Zambia, R Zambia/ZNBC 1	7220do			
0900-1000 vl	Zimbabwe, Zimbabwe BC	5975do			
0915-1000	Ghana, Ghana Broadc Corp	6130do	7295do		
0930-0955 mtwhfa	Austria, R Austria Intl	15240au	17870au		
0930-1000	Canada, CKZN St John's	6160do			
0930-1000	Georgia, Radio	11910me			
0930-1000	Netherlands, Radio	12065au	13710pa		
0930-1000	Philippines, FEBC/R Intl	11635as			
0944-0949 vl	Kazakhstan, Radio Almaty	11840eu			

1000-1100	Anguilla,Caribbean Beacon	6090am			
1000-1100	Australia, Radio	9710pa	9860pa	13605as	21725as
1000-1100 vl	Australia, VL8A Alice Spg	2310do			
1000-1100 vl	Australia, VL8K Katherine	2485do			
1000-1100 vl	Australia, VL8T Tent Crk	2325do			
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFCX Montreal	6005do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1100	China, China Radio Intl	9785pa	11755pa		
1000-1100	Costa Rica,RF Peace Intl	6205am	7385am		
1000-1100	Ecuador, HCJB	9645pa	21455au		
1000-1100 as	Eqt Guinea, R East Africa	15186af			
1000-1100 mtwhf	Eqt Guinea, Radio Africa	15186af			
1000-1100	Guam, AWR/KSDA	11790as			
1000-1100	Guam, TWR/KTWR	9865as			
1000-1100	India, All India Radio	11585as	13700as	15050as	17387au
		17840as			
1000-1025	iSrael, Kol Israel	15640eu			
1000-1100 vl	Italy, IRRS	7125va			
1000-1100	Jordan, Radio	11690eu			
1000-1100	Lebanon, Voice of Hope	9960va			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia, RTM Kuching	7160do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1025	Netherlands, Radio	12065au	13710pa		
1000-1100	New Zealand, R NZ Intl	6100pa			
1000-1100 as	Palau, KHBN/Voice of Hope	9730as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC/R Intl	11635as			
1000-1100	Russia,Voice of Russia WS	7330as	9810as	9835as	11655as
		11800au	11880au	15170pa	15435pa
		15490va	15510va	17560va	17610va
		17775va	17795va		
1000-1035 vl	Solomon Islands, SIBC	5020do	9545do		
1000-1100	United Kingdom, BBC WS	5965va	6190af	6195am	9410eu
		9740as	11750as	11760as	11765va
		11940af	12095eu	15310as	15485va
		15565as	15575me	17640af	17705af
		17885va	21660as		
1000-1100 as	United Kingdom, BBC WS	15190am	15400am	17830af	
1000-1030	United Kingdom, BBC WS	15360as			
1000-1100	USA, KAIJ Dallas TX	5810am			
1000-1100	USA, KTBN Salt Lk City UT	7510am			
1000-1100	USA, KWHR Naalehu HI	9930as			
1000-1100	USA, Monitor Radio Intl	6095na	7395sa	15665as	15725as
1000-1100	USA, Voice of America	5985pa	6165am	7405am	9590am
		11720as	15425as		
1000-1100	USA, WEWN Birmingham AL	15745na			
1000-1100	USA, WGTG McCaysville GA	9400am			
1000-1100	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1000-1100	USA, WJCR Upton KY	7490na			
1000-1100	USA, WRMI/R Miami Intl	9955am			
1000-1100	USA, WRNO New Orleans LA	7355am			
1000-1100 as	USA, WVHA Greenbush ME	13825af			
1000-1100	USA, WWCR Nashville TN	2390am	5070am	5935am	15685am
1000-1100	USA, WYFR Okeechobee FL	5950na			
1000-1030	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1000-1100	Zambia, Christian Voice	6065af			
1000-1100 vl	Zambia, R Zambia/ZNBC 1	7220do			
1020-1030 mtwhf	Vatican State, Vatican R	5882eu	9645eu	11740eu	15595eu
		17550eu			
1030-1055 s	Austria, R Austria Intl	15240au	17870au		
1030-1057	Czech Rep, Radio Prague	7345eu	9505eu		
1030-1100 mtwhf	Ethiopia, Radio	5990do	7110do	9705do	
1030-1100	Guam, AWR/KSDA	15170as			
1030-1100	Netherlands, Radio	6045eu	9860eu	12065as	13710as
1030-1100	South Korea, R Korea Intl	11715am			
1030-1100	Sri Lanka, Sri Lanka BC	11835as	17850as		
1030-1055	UAE, Radio Dubai	13675eu	15395eu	17630eu	21605me

Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.

Frequencies

1100-1200	Anguilla,Caribbean Beacon	11775am			
1100-1200	Australia, Radio	9580pa	9770pa	9860pa	11660as
		13605as			
1100-1130	Australia, Radio	11640as			
1100-1200 vl	Australia, VL8A Alice Spg	2310do			
1100-1200 vl	Australia, VL8K Katherine	2485do			
1100-1200 vl	Australia, VL8T Tent Crk	2325do			
1100-1200	Canada, CFCX Montreal	6005do			
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica, Adv World R	5030am	6150am	7375am	9725am
		13750am			
1100-1200	Costa Rica,RF Peace Intl	6205am	7385am		
1100-1200	Ecuador, HCJB	12005am	15115am	21455au	
1100-1200 as	Eqt Guinea, R East Africa	15186af			
1100-1200	Eqt Guinea, Radio Africa	9530as			
1100-1150	Germany, Deutsche Welle	15370af	15410af	17765af	17800af
1100-1200	Iran, VOIRI	7180me	9585af	11875me	15260af
1100-1200 vl	Italy, IRRS	7125va			
1100-1200	Japan, R Japan/NHK World	6120na	7125na	11815as	
1100-1200	Jordan, Radio	11690eu			
1100-1200	Lebanon, Voice of Hope	9960va			
1100-1110	Liberia,LCN/R Liberia Int	5100do			
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia, RTM Kuching	7160do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1200	Mozambique, Radio Maputo	11820af	11835af		
1100-1125	Netherlands, Radio	12065as	13710as		
1100-1200	New Zealand, R NZ Intl	6100pa			
1100-1150	North Korea, R Pyongyang	4404na	6575na	9975na	11335na
1100-1130 as	Palau, KHBN/Voice of Hope	9730as			
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Russia,Voice of Russia WS	4740as	11655as	11880as	15170as
		15460as	15490as	15510as	15560as
		17560as	17610as	17755as	17775as
		17795as			
1100-1200	Singapore,R Singapore Int	6105as	6155as		
1100-1130	Sri Lanka, Sri Lanka BC	11835as	17850as		
1100-1130	Switzerland, Swiss R Intl	13635as	15415as	17515as	
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200	United Kingdom, BBC WS	5965am	6190af	6195va	9410eu
		9580as	11750as	11760as	11940af
		11955as	12095eu	15220am	15310as
		15485va	15565as	15575va	17640na
		17705eu	17830af	17885af	21660af
1100-1130 as	United Kingdom, BBC WS	15190am			
1100-1130	United Kingdom, BBC WS	9700as	11765va	15310as	17785as
1100-1145	United Kingdom, BBC WS	15400af	17790as		
1100-1200	USA, KAIJ Dallas TX	5810am			
1100-1200	USA, KTBN Salt Lk City UT	7510am			
1100-1200	USA, KWHR Naalehu HI	9930as			
1100-1200	USA, Monitor Radio Intl	6095na	7395sa	9355eu	9430au
1100-1200	USA, Voice of America	5985pa	6160as	9645as	9760as
		11720as	15160as	15425as	
1100-1200	USA, WEWN Birmingham AL	15375eu	15745na		
1100-1200	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1100-1200	USA, WJCR Upton KY	7490na			
1100-1200	USA, WRMI/R Miami Intl	9955am			
1100-1200	USA, WRNO New Orleans LA	7355am			
1100-1200 as	USA, WVHA Greenbush ME	13825eu			
1100-1200	USA, WWCR Nashville TN	2390am	5935am	7435am	15685am
1100-1200	USA, WYFR Okeechobee FL	5950na	11830na		
1100-1130	Vietnam, Voice of	7285as	9730as		
1100-1200	Zambia, Christian Voice	6065af			
1100-1200 vl	Zambia, R Zambia/ZNBC 1	7220do			
1104-1120	Pakistan, Radio	15465eu	17865eu		
1120-1140	Australia,DefenseForces R	4763as			
1130-1140	Lesotho, Radio Lesotho	4800do			
1130-1200	Myanmar, Voice of	5990do			
1130-1200	Netherlands, Radio	6045eu	9860eu		
1130-1200	Sweden, Radio	11650na	15240na		
1130-1200	United Kingdom, BBC WS	6195am	17705va		
1130-1200 f	Vatican State, Vatican R	15595as	17550au		
1135-1140	India, All India Radio	9595do	11620do	11710do	15185do

Selected Programs

Sundays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1106 Germany, Deutsche Welle: Commentary. Guest commentary about a current event.
1108 Germany, Deutsche Welle: Arts on the Air. Reports and interviews on major cultural events and developments.
1108 Germany, Deutsche Welle: Feature of the Month (1). A special feature on important developmental issues of our time.
1111 Russia, Voice of: News and Views. See S 0311.
1125 Japan, NHK/Radio: Profile. See S 0025.
1130 Russia, Voice of: News in Brief. See S 0030.
1132 Russia, Voice of: This is Russia. See S 0532.
1133 Germany, Deutsche Welle: German by Radio. An advanced German language course for English speakers.

Mondays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1106 Germany, Deutsche Welle: NewsLink. Global current affairs as seen from the heart of Europe.
1111 Russia, Voice of: News and Views. See S 0311.
1115 Japan, NHK/Radio: 44 Minutes. See M 0015.
1130 Russia, Voice of: News in Brief. See S 0030.
1132 Russia, Voice of: Music at Your Request. Music as requested by listeners.
1133 Germany, Deutsche Welle: Africa Report. Reports and background to the news from Africa by Deutsche Welle correspondents.

Tuesdays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1106 Germany, Deutsche Welle: NewsLink. See M 1106.
1111 Russia, Voice of: News and Views. See S 0311.
1115 Japan, NHK/Radio: 44 Minutes. See M 0015.
1130 Russia, Voice of: News in Brief. See S 0030.
1130 UK, BBC London (AE): Stories for Life (1st,8th). The story of how Ghana was a great African empire about a thousand years ago.
1132 Russia, Voice of: Folk Box. See S 2332.
1133 Germany, Deutsche Welle: Africa Report. See M 1133.

Wednesdays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1106 Germany, Deutsche Welle: NewsLink. See M 1106.
1111 Russia, Voice of: News and Views. See S 0311.
1115 Japan, NHK/Radio: 44 Minutes. See M 0015.
1130 Russia, Voice of: News in Brief. See S 0030.
1132 Russia, Voice of: Folk Box. See S 2332.
1133 Germany, Deutsche Welle: Africa Report. See M 1133.
1144 Japan, NHK/Radio: Close Up. Featuring a Japanese person of note.
1151 Japan, NHK/Radio: Tumbling Dice. See M 0651.

Thursdays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1106 Germany, Deutsche Welle: NewsLink. See M 1106.
1111 Russia, Voice of: News and Views. See S 0311.
1115 Japan, NHK/Radio: 44 Minutes. See M 0015.
1130 Russia, Voice of: News in Brief. See S 0030.
1132 Russia, Voice of: The Jazz Show. See M 0432.
1133 Germany, Deutsche Welle: Africa Report. See M 1133.

Fridays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1106 Germany, Deutsche Welle: NewsLink. See M 1106.
1111 Russia, Voice of: News and Views. See S 0311.
1115 Japan, NHK/Radio: 44 Minutes. See M 0015.
1130 Russia, Voice of: News in Brief. See S 0030.
1132 Russia, Voice of: Yours for the Asking. See M 2332.
1133 Germany, Deutsche Welle: Africa Report. See M 1133.
1145 Japan, NHK/Radio: News Commentary. See M 0638.
1151 Japan, NHK/Radio: Close Up. See W 1144.

Saturdays

1100 Germany, Deutsche Welle: News. See S 0100.
1100 Japan, NHK/Radio: News. See S 0000.
1100 Russia, Voice of: News. See S 0000.
1101 UK, BBC London (AF): Heritage (5th,12th). Malcolm Billings reports on archaeological excavations, museums and the conservation of historic buildings in locations around the world.
1108 Germany, Deutsche Welle: Commentary. See S 1106.
1110 Japan, NHK/Radio: Weekend Break. See M 0125.
1111 Russia, Voice of: News and Views. See S 0311.
1112 Germany, Deutsche Welle: Germany This Week. A summary of the week's events in Germany by Deutsche Welle's Bonn correspondents.
1120 Germany, Deutsche Welle: Mailbag Africa. Listener mail from Africa is answered.
1130 Russia, Voice of: News in Brief. See S 0030.
1132 Russia, Voice of: Music at Your Request. See M 1132.
1138 Germany, Deutsche Welle: Saturday Special. Information unavailable.

Hauser's Highlights

ISRAËL: Kol Israël

Sked shows new English broadcast:
1545-1600 UTC 12080, 15650
More unconfirmed English additions:
1000 or 1015 UTC 15640
1500-1525 9435, 11695, 15640
(George J. Poppin, CA via Joe Hanlon, *DXLD*)

FREQUENCIES

1200-1300	Anguilla,Caribbean Beacon	11775am			
1200-1300	Australia, Radio	5995as	9580pa	9710as	9860pa
		11660as	13605as		
1200-1300 vl	Australia, VL8A Alice Spg	2310do			
1200-1300 vl	Australia, VL8K Katherine	2485do			
1200-1300 vl	Australia, VL8T Tent Crk	2325do			
1200-1300	Brazil, Radio Bras	15445na			
1200-1230	Bulgaria, Radio	13790as			
1200-1215	Cambodia, Natl Voice of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFCX Montreal	6005do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1230	Canada, R Canada Intl	9660as	9715me	11835me	11975me
		15195as			
1200-1300	Canada, R Canada Intl	9640am	11855am	13650am	
1200-1300	China, China Radio Intl	7385pa	9715as	11795pa	
1200-1300 vl	Cyprus, BRT International	6150do			
1200-1300	Ecuador, HCJB	12005am	15115am	21455am	
1200-1300 as	Eqt Guinea, R East Africa	15186af			
1200-1300	Eqt Guinea, Radio Africa	9530as			
1200-1300	France, Radio France Intl	9805af	11600va	13625eu	15155eu
		15195eu	15540af	17575af	
1200-1230	Iran, VOIRI	7180me	9585me	11875me	15260af
1200-1300 vl	Italy, IRRS	7125va			
1200-1300	Japan, R Japan/NHK World	7125as			
1200-1300	Jordan, Radio	11690eu			
1200-1300	Lebanon, Voice of Hope	9960va			
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1250	Myanmar, Voice of	5990do			
1200-1300	Netherlands, Radio	6045eu	9860eu		
1200-1206	New Zealand, R NZ Intl	6100pa			
1200-1300	Nigeria, Voice of	7255af			
1200-1230 s	Norway, Radio Norway Intl	9590eu	13800as	13805na	15605au
1200-1300 vl	Papua New Guinea, NBC	4890do			
1200-1255	Poland, Polish R Warsaw	6095eu	7145eu	7270eu	9525eu
		11815eu			
1200-1300	Russia,Voice of Russia WS	4740as	4975as	11655as	11785as
		11880as	15110as	15170as	15230as
		15430as	15435as	15490as	15510as
		17610as	17755as	17775as	17795as
1200-1300	Singapore,R Singapore Int	6105as	6155as		
1200-1300	South Korea, R Korea Intl	7285af			
1200-1300	Taiwan, VO Free China	7130au	9610as		
1200-1300	Ukraine, R Ukraine Intl	7150eu	7180eu	12050na	
1200-1300	United Kingdom, BBC WS	6190af	6195va	9410eu	9515am
		9580as	9740as	11750as	11760as
		11940af	11955as	15220am	15310as
		15485va	15565va	15575va	17640va
		17705af	17830af	17885af	21660af
1200-1300	USA, KAIJ Dallas TX	5810am			
1200-1300	USA, KTBN Salt Lk City UT	7510am			
1200-1300	USA, KWHR Naalehu HI	9930as			
1200-1300	USA, Monitor Radio Intl	6095na	9355as	9430au	9455sa
1200-1230	USA, Voice of America	6160as	9645as	9760as	11715as
		15160as	15425as		
1200-1300	USA, WEWN Birmingham AL	15375sa	15745eu		
1200-1300	USA, WGTG McCaysville GA	9400am			
1200-1300	USA, WHRI Noblesville IN	6040am	9495am	9930am	
1200-1300	USA, WJCR Upton KY	7490na			
1200-1300	USA, WRMI/R Miami Intl	9955am			
1200-1300	USA, WRNO New Orleans LA	7355am			
1200-1300	USA, WWCR Nashville TN	7435am	9475am	13845am	15685am
1200-1300	USA, WYFR Okeechobee FL	5950na	11830na	17750na	
1200-1230	Uzbekistan, R Tashkent	7285as	9715as	15295as	
1200-1300	Zambia, Christian Voice	6065af			
1200-1300 vl	Zambia, R Zambia/ZNBC 1	7220do			
1207-1300 occsnal	New Zealand, R NZ Intl	6100pa			
1215-1300	Egypt, Radio Cairo	17595as			
1215-1300	United Kingdom, BBC WS	15220am			
1230-1255	Austria, R Austria Intl	6155eu	13730na		
1230-1300	Bangladesh, Bangla Betar	7185as	9550as		
1230-1255 s	Belgium, R Vlaanderen Int	13785na	15535as		
1230-1300 mtwhf	Finland, YLE/R Finland	11900na	15400na		
1230-1300	Guam, AWR/KSDA	13720as			
1230-1235	India, All India Radio	4860do	6185do	17865do	
1230-1300 w	Indonesia, RRI Sorong	4875do			
1230-1300	Mongolia, Voice of	12085as			
1230-1300	Romania, R Romania Intl	9690eu	11885eu	15365eu	17720eu
1230-1300	Serbia, Radio Yugoslavia	11835eu			
1230-1300	South Korea, R Korea Intl	9570as	9640as	13670as	
1230-1300 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1230-1300	Sweden, Radio	13740as	15240pa		
1230-1300	Thailand, Radio	9505as	9655as	9810as	
1230-1300	Turkey, Voice of	13750eu	15290as		
1230-1300	Vietnam, Voice of	5940as	7270as	7400as	9840as
		12020as	15010as		
1240-1250	Greece, Voice of	11645af			

SELECTED PROGRAMS

Sundays

1200 Canada, RCI Montreal: CBC Radio News. News, sports, and weather from the Canadian Broadcasting Corporation.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1206 Canada, RCI Montreal: Quirks and Quarks. Updating what's new and what's next in science.
1210 Japan, NHK/Radio: Hello from Tokyo. See S 0110.
1211 Russia, Voice of: Music and Musicians. See S 0111.
1235 Belgium, R Vlaanderen Intl: Radio World. See S 0635.
1245 Belgium, R Vlaanderen Intl: PO Box 26. See S 0645.

Mondays

1200 Canada, RCI Montreal: CBC Radio News. See S 1200.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1207 Canada, RCI Montreal: Double Exposure. The comedy team of Bob Robertson and Linda Cullen present their award-winning brand of political satire and mimicry.
1211 Russia, Voice of: Newmarket. This program tells where and how to invest in Russia, how to sell your product, or start a business.
1215 Japan, NHK/Radio: Asian Top News. See M 0115.
1225 Japan, NHK/Radio: Sound of Asia. See M 0125.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Russian by Radio. See S 0632.
1234 Canada, RCI Montreal: The Royal Canadian Air Farce. The traveling comedy show that was brought back by popular demand.

Tuesdays

1200 Canada, RCI Montreal: CBC Radio News. See S 1200.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1211 Canada, RCI Montreal: As It Happens. A daily phone-in show introducing listeners to the newsmakers of the day and people whose stories might otherwise not be told.
1211 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1215 Japan, NHK/Radio: Asian Top News. See M 0115.
1230 Russia, Voice of: News in Brief. See S 0030.
1230 UK, BBC London (AF): Red Hills of Home (1st,8th). See T 0030.
1232 Russia, Voice of: This is Russia. See S 0532.

Wednesdays

1200 Canada, RCI Montreal: CBC Radio News. See S 1200.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1211 Canada, RCI Montreal: As It Happens. See T 1211.
1211 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1215 Japan, NHK/Radio: Asian Top News. See M 0115.
1225 Japan, NHK/Radio: Music Reflections. See W 0125.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

Thursdays

1200 Canada, RCI Montreal: CBC Radio News. See S 1200.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1211 Canada, RCI Montreal: As It Happens. See T 1211.
1211 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1215 Japan, NHK/Radio: Asian Top News. See M 0115.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: This is Russia. See S 0532.

Fridays

1200 Canada, RCI Montreal: CBC Radio News. See S 1200.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1211 Canada, RCI Montreal: As It Happens. See T 1211.
1211 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1215 Japan, NHK/Radio: Asian Top News. See M 0115.
1225 Japan, NHK/Radio: Music Beat. See F 0125.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Moscow Yesterday and Today. See S 0432.

Saturdays

1200 Canada, RCI Montreal: CBC Radio News. See S 1200.
1200 Japan, NHK/Radio: News. See S 0000.
1200 Russia, Voice of: News. See S 0000.
1210 Japan, NHK/Radio: Asia Weekly. See A 0110.
1211 Canada, RCI Montreal: As It Happens. See T 1211.
1211 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1215 UK, BBC London (AF): Living Together (28th,4th,11th). See M 0130.
1230 Russia, Voice of: News in Brief. See S 0030.
1232 Russia, Voice of: Your Top Tune. See S 0232.
1247 Russia, Voice of: You Write to Moscow. See S 0247.

HAUSER'S HIGHLIGHTS
PHILIPPINES: FEBC

DX Dial:

Wed	1315 UTC	11995 kHz
Sat	0115	15450
	0940	11635, 1440 11995

(*Electronic DX Press*)

Frequencies

1300-1400	Anguilla,Caribbean Beacon	11775am			
1300-1400	Australia, Radio	9580pa	9770pa	11800pa	
1300-1330	Australia, Radio	13605as			
1300-1400 vl	Australia, VL8A Alice Spg	2310do			
1300-1400 vl	Australia, VL8K Katherine	2485do			
1300-1400 vl	Australia, VI8T Tent Crk	2325do			
1300-1325 mtwhfa	Belgium, R Vlaanderen Int	13785as	15535as		
1300-1320	Brazil, Radio Bras	15445na			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFCX Montreal	6005do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400 mtwhf	Canada, R Canada Intl	9640am	11855am	13650am	
1300-1400 s	Canada, R Canada Intl	11855am	13650am		
1300-1400	China, China Radio Intl	6140as	7385pa	9535as	9715as
		11660pa			
1300-1400	Costa Rica,RF Peace Intl	6205am	7385am		
1300-1330	Czech Rep, Radio Prague	13580eu	17485af		
1300-1400	Ecuador, HCJB	12005am	15115am	21455am	
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400 as	Eqt Guinea, R East Africa	15186af			
1300-1400	Eqt Guinea, Radio Africa	9530as			
1300-1330 vl	Italy, IRRS	7125va			
1300-1400	Jordan, Radio	11690eu			
1300-1310	Liberia LCN/R Liberia Int	5100do			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia, RTM Kuching	7160do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1400 occsnal	New Zealand, R NZ Intl	6100pa			
1300-1400	Nigeria, Voice of	7255af			
1300-1350	North Korea, R Pyongyang	9345as	9640eu	11740as	15230as
1300-1400 vl	Papua New Guinea, NBC	4890do			
1300-1400	Philippines, FEBC/R Intl	11995as			
1300-1356	Romania, R Romania Intl	9690eu	11885eu	15365eu	17720eu
1300-1400	Russia Voice of Russia WS	15430as	15460as	15560as	17610as
		17795as			
1300-1400	Singapore,R Singapore Int	6105as	6155as		
1300-1400 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1300-1330	Switzerland, Swiss R Intl	7230as	7480as	13635as	15120as
1300-1330	Turkey, Voice of	13695eu	13750va	15290as	
1300-1400	United Kingdom, BBC WS	5990as	6190af	6195va	9410eu
		9515am	9740va	11750as	11760as
		11865am	11940af	12095eu	15220am
		15310as	15420af	15485va	15565as
		15575va	17640va	17705af	17830af
		17885af	21470af	21660af	
1300-1400	USA, KAIJ Dallas TX	13815am			
1300-1400	USA, KNLS Anchor Point AK	7365as			
1300-1400	USA, KTBN Salt Lk City UT	7510am			
1300-1400	USA, KWHR Naalehu HI	9930as			
1300-1400	USA, Monitor Radio Intl	6095na	9355as	9455am	13840as
1300-1330	USA, Voice of America	6160as	9645as	9760as	11715as
		15160as	15425as		
1300-1400	USA, WEWN Birmingham AL	7425na	11875na	15375sa	15745eu
1300-1400	USA, WGTG McCaysville GA	9400am			
1300-1400	USA, WHRI Noblesville IN	6040am	9930am	15105am	
1300-1400	USA, WJCR Upton KY	7490na			
1300-1400 mtwhf	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WRNO New Orleans LA	7355am			
1300-1400 as	USA, WVHA Greenbush ME	15745na			
1300-1400	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1300-1400	USA, WYFR Okeechobee FL	5950na	11550as	11830na	13695na
		17750ca			
1300-1400	Zambia, Christian Voice	6065af			
1300-1400 vl	Zambia, R Zambia/ZNBC 1	7220do			
1330-1400	Canada, R Canada Intl	9535as	11795as	11935eu	15325me
		17820af			
1330-1400	China, Heilongjiang PBS	4840do			
1330-1400	Guam, AWR/KSDA	9650as			
1330-1400	India, All India Radio	9545as	11620as	13710as	
1330-1400 vl	Italy, IRRS	3985va			
1330-1400	Netherlands, Radio	9890as	12090as	15585as	
1330-1400 vl	Pakistan, Radio	9485af	11565af	15595me	
1330-1400 mtwhf	Portugal, R Portugal Intl	21515as			
1330-1400	Sweden, Radio	11650na	13740pa	15240na	
1330-1355	UAE, Radio Dubai	15395eu	17630eu	21605me	
1330-1400	Uzbekistan, R Tashkent	7285as	9715as	15295as	
1330-1400	Vietnam, Voice of	5940eu	7270eu	7400eu	9840as
		12020eu	15010as		
1335-1345	Greece, Voice of	9375eu	15175na	15630na	
1345-1400	Vatican State, Vatican R	11625as	13765au		
1350-1400	South Korea, KBS-1	3930do			

Selected Programs

Sundays

1300 Canada, RCI Montreal: World Report. CBC News.
1300 Russia, Voice of: News. See S 0000.
1311 Canada, RCI Montreal: Sunday Morning (1st hour). CBC Radio's powerful and critically acclaimed three-hour current affairs program examines the events and ideas that shape our world.
1311 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
1330 Canada, RCI Montreal: RCI News. News, weather, and sports from Radio Canada International.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Your Top Tune. See S 0232.
1335 Canada, RCI Montreal: The Mailbag. Listener letters, musical selections, and happenings in Canada.
1347 Russia, Voice of: You Write to Moscow. See S 0247.

Mondays

1300 Canada, RCI Montreal: CBC Radio News. See S 1200.
1300 Russia, Voice of: News. See S 0000.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. Repeats of the CBC's morning program.
1311 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1311 Russia, Voice of: Moscow Mailbag. See S 0011.
1315 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
1321 Belgium, R Vlaanderen Intl: Tourism. See M 0651.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Canada, RCI Montreal: RCI News. See S 1330.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Audio Book Club. See S 0032.
1339 Canada, RCI Montreal: Spectrum. A weekday magazine program of current affairs, features, and a business report.

Tuesdays

1300 Canada, RCI Montreal: CBC Radio News. See S 1200.
1300 Russia, Voice of: News. See S 0000.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1309 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1311 Russia, Voice of: Newmarket. See M 1211.
1316 Belgium, R Vlaanderen Intl: Focus on Europe. See M 2344.
1320 Belgium, R Vlaanderen Intl: Sports Report. See M 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Canada, RCI Montreal: RCI News. See S 1330.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Kaleidoscope. See S 1432.
1339 Canada, RCI Montreal: Spectrum. See M 1339.

Wednesdays

1300 Canada, RCI Montreal: CBC Radio News. See S 1200.
1300 Russia, Voice of: News. See S 0000.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1309 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1311 Russia, Voice of: Moscow Mailbag. See S 0011.
1316 Belgium, R Vlaanderen Intl: Living in Belgium. See T 2345.
1320 Belgium, R Vlaanderen Intl: Green Society. See T 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Canada, RCI Montreal: RCI News. See S 1330.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Russian by Radio. See S 0632.
1339 Canada, RCI Montreal: Spectrum. See M 1339.

Thursdays

1300 Canada, RCI Montreal: CBC Radio News. See S 1200.
1300 Russia, Voice of: News. See S 0000.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1310 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1311 Russia, Voice of: Moscow Mailbag. See S 0011.
1315 Belgium, R Vlaanderen Intl: The Arts. See M 0645.
1319 Belgium, R Vlaanderen Intl: Around Town. See W 2344.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Canada, RCI Montreal: RCI News. See S 1330.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Kaleidoscope. See S 1432.
1339 Canada, RCI Montreal: Spectrum. See M 1339.

Fridays

1300 Canada, RCI Montreal: CBC Radio News. See S 1200.
1300 Russia, Voice of: News. See S 0000.
1305 Canada, RCI Montreal: The Best of Morningside. See M 1305.
1306 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1311 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
1311 Russia, Voice of: Moscow Mailbag. See S 0011.
1316 Belgium, R Vlaanderen Intl: International Report. See H 2344.
1319 Belgium, R Vlaanderen Intl: Economics. See H 2349.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Canada, RCI Montreal: RCI News. See S 1330.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Russian by Radio. See S 0632.
1339 Canada, RCI Montreal: Spectrum. See M 1339.

Saturdays

1300 Russia, Voice of: News. See S 0000.
1305 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
1310 Belgium, R Vlaanderen Intl: Music from Flanders. See A 0640.
1311 Russia, Voice of: Program Preview. See S 0411.
1325 Belgium, R Vlaanderen Intl: Music. See S 2355.
1330 Canada, RCI Montreal: RCI News. See S 1330.
1330 Russia, Voice of: News in Brief. See S 0030.
1332 Russia, Voice of: Audio Book Club. See S 0032.
1335 Canada, RCI Montreal: Venture Canada. A new weekly magazine promoting Canadian business achievement.

1400 UTC SHORTWAVE GUIDE 10:00 AM EDT 7:00 AM PDT

Frequencies

1400-1500	Anguilla,Caribbean Beacon	11775am			
1400-1500	Australia, Radio	5995pa	9580pa	9860pa	11800pa
1400-1430	Australia, Radio	9770pa			
1400-1500 vl	Australia, VL8A Alice Spg	2310do			
1400-1500 vl	Australia, VL8K Katherine	2485do			
1400-1500 vl	Australia, VI8T Tent Crk	2325do			
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFCX Montreal	6005do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500 s	Canada, R Canada Intl	11855am	13650am		
1400-1500	China, China Radio Intl	7405na	11825as		
1400-1500	Ecuador, HCJB	12005am	15115am	21455am	
1400-1500 as	Eqt Guinea, R East Africa	15186af			
1400-1500	France, Radio France Intl	11910as	15405me	17560me	
1400-1500	India, All India Radio	9545as	11620as	13710as	
1400-1430	Israel, Kol Israel	12080na	15650na		
1400-1500 vl	Italy, IRRS	3985va			
1400-1500	Japan, R Japan/NHK World	7200eu			
1400-1500	Jordan, Radio	11690eu			
1400-1500	Malaysia, Radio	7295do			
1400-1500	Malaysia, RTM Kuching	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1430	Mexico, Radio Mexico Intl	9705na			
1400-1500	Netherlands, Radio	9890as	12090as	15585as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100pa			
1400-1410	Pakistan, Radio	9485af	11565af	15595me	
1400-1500 vl	Papua New Guinea, NBC	4890do			
1400-1500	Philippines, FEBC/R Intl	11995as			
1400-1500	Russia,Voice of Russia WS	4740me	4940me	4975me	7345as
		9595me	9800as	11665me	11835me
		11985me	15350me	15430me	15540me
1400-1500	Singapore,R Corp of Sing	6155do			
1400-1500	Sri Lanka, Sri Lanka BC	9730as			
1400-1430	Thailand, Radio	9655as	9830as	11905as	
1400-1500	United Kingdom, BBC WS	5990as	6190af	6195as	9410eu
		9515am	9740as	11750as	11865am
		11940af	12095eu	15220am	15485va
		15565as	15575va	17640va	17830af
		17840am	21470af	21660af	
1400-1500	USA, KAIJ Dallas TX	13815am			
1400-1500	USA, KJES Mesquite NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510am			
1400-1500	USA, Monitor Radio Intl	9355as			
1400-1500	USA, Voice of America	6160as	7125as	7215as	9645as
		9760as	15160as	15225va	15395as
		15425as			
1400-1500	USA, WEWN Birmingham AL	9455na	11875na	15745eu	
1400-1500	USA, WGTG McCaysville GA	9400am			
1400-1500	USA, WHRI Noblesville IN	6040am	9930am	15105am	
1400-1500	USA, WJCR Upton KY	7490na			
1400-1500	USA, WRMI/R Miami Intl	9955am			
1400-1500	USA, WRNO New Orleans LA	7355am			
1400-1500 as	USA, WVHA Greenbush ME	15745na			
1400-1500	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1400-1500	USA, WYFR Okeechobee FL	5950na	11550sa	11830na	17750ca
1400-1405	Vatican State, Vatican R	11625as	13765au		
1400-1500	Zambia, Christian Voice	6065af			
1400-1500 vl	Zambia, R Zambia/ZNBC 1	4910do			
1415-1430 vl	Cyprus, BRT International	6150do			
1415-1427	Nepal, Radio	5005do			
1420-1500 as	Palau, KHBN/Voice of Hope	9985as			
1430-1500	Australia, Radio	6060pa	6080pa	9615as	9850pa
		9860pa	11660as		
1430-1500	Guam, AWR/KSDA	7400as			
1430-1440	India, All India Radio	3945do	6185do	9565do	9685do
1430-1440 mtwhf	Indonesia, RRI Uj Pandang	4753do			
1430-1500	Romania, R Romania Intl	15335as	17720as		
1430-1500 vl	Zambia, R Zambia/ZNBC 2	6165do			
1440-1500	Myanmar, Voice of	5990do			

Selected Programs

Sundays

1400 Canada, RCI Montreal: News. News from either the Canadian Broadcasting Corporation (CBC) or Radio Canada International (RCI).
1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1401 UK, BBC London (AE/AF/AS): It's Your Verdict! (6th). Listeners are invited to call-in on a debate about topical issues.
1406 Canada, RCI Montreal: Sunday Morning (2nd hour). See S 1311.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Russia, Voice of: News and Views. See S 0311.
1413 China, China Radio Intl: Sports Beat. News from the world of sports.
1420 China, China Radio Intl: China Snapshots. A tour around cities and town in China with focus on local flavor and customs.
1425 China, China Radio Intl: In the Third World. A report on projects in developing countries.
1425 Japan, NHK/Radio: Profile. See S 0025.
1432 Russia, Voice of: Kaleidoscope. A variety of topics ranging from science and ecology to cultural matters.
1435 China, China Radio Intl: Song of the Week. A selection of the new pop music in China.
1445 China, China Radio Intl: Listeners' Letterbox. Listener letters and information about China.

Mondays

1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Russia, Voice of: News and Views. See S 0311.
1415 Japan, NHK/Radio: 44 Minutes. See M 0015.
1420 China, China Radio Intl: Current Affairs. An in-depth look at events and happenings in China.
1430 China, China Radio Intl: Press Clippings. Several items from the Chinese press.
1430 UK, BBC London (AS): Living Together (30th,7th,14th). See M 0130.
1432 Russia, Voice of: Folk Box. See S 2332.
1434 China, China Radio Intl: China's Open Windows. Focus on a particular area of investment in China.
1439 China, China Radio Intl: Changzhou Reports. A look at this industrial city in East China's Jiangsu Province and the people who live and work there.
1445 China, China Radio Intl: Idioms and Their Stories. A regular feature for students studying Chinese.

Tuesdays

1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Russia, Voice of: News and Views. See S 0311.
1415 China, China Radio Intl: News Analysis. Background on current news events.
1415 Japan, NHK/Radio: 44 Minutes. See M 0015.
1419 China, China Radio Intl: Current Affairs. See M 1420.
1432 Russia, Voice of: Yours for the Asking. See M 2332.
1433 China, China Radio Intl: Press Clippings. See M 1430.
1438 China, China Radio Intl: Orient Arena. Focus on sporting events and Chinese sports personalities.
1445 China, China Radio Intl: Listeners' Letterbox. See S 1445.

Wednesdays

1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Russia, Voice of: News and Views. See S 0311.
1415 Japan, NHK/Radio: 44 Minutes. See M 0015.
1420 China, China Radio Intl: Current Affairs. See M 1420.
1432 Russia, Voice of: The Jazz Show. See M 0432.
1433 China, China Radio Intl: Press Clippings. See M 1430.
1438 China, China Radio Intl: Profile. The activities of an interesting individual are examined.
1445 China, China Radio Intl: Learn to Speak Chinese. Chinese language lessons for English speakers.

Thursdays

1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Russia, Voice of: News and Views. See S 0311.
1415 China, China Radio Intl: News Analysis. See T 1415.
1415 Japan, NHK/Radio: 44 Minutes. See M 0015.
1419 China, China Radio Intl: Current Affairs. See M 1420.
1432 Russia, Voice of: Yours for the Asking. See M 2332.
1434 China, China Radio Intl: Press Clippings. See M 1430.
1438 China, China Radio Intl: Focus. Looking at an issue of significance to China's development.
1444 China, China Radio Intl: Cultural Spectrum. The rich cultural heritage of China in literature, music and art.

Fridays

1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1410 China, China Radio Intl: News about China. See S 0010.
1411 Russia, Voice of: News and Views. See S 0311.
1415 Japan, NHK/Radio: 44 Minutes. See M 0015.
1420 China, China Radio Intl: Current Affairs. See M 1420.
1432 Russia, Voice of: Music at Your Request. See M 1132.
1434 China, China Radio Intl: Life in China. Focus on an aspect of everyday living.
1446 China, China Radio Intl: Global Review. News about developing nations.

Saturdays

1400 China, China Radio Intl: News. See S 0000.
1400 Japan, NHK/Radio: News. See S 0000.
1400 Russia, Voice of: News. See S 0000.
1410 China, China Radio Intl: News about China. See S 0010.
1410 Japan, NHK/Radio: Weekend Break. See M 0125.
1411 Russia, Voice of: News and Views. See S 0311.
1417 China, China Radio Intl: Chinese Folktales. See S 0017.
1423 China, China Radio Intl: The Cooking Show. See S 0023.
1427 China, China Radio Intl: China Scrapbook. See S 0027.
1432 Russia, Voice of: Timelines. See S 1632.
1435 China, China Radio Intl: Music from China. See S 0035.

Frequencies

1500-1600	Anguilla,Caribbean Beacon	11775am			
1500-1600	Australia, Radio	5995pa	6060pa	6080pa	9580pa
		9615as	9850pa	11660as	11800pa
		12080pa			
1500-1600 vl	Australia, VL8A Alice Spg	2310do			
1500-1600 vl	Australia, VL8K Katherine	2485do			
1500-1600 vl	Australia, VL8T Tent Crk	2325do			
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFCX Montreal	6005do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, R Canada Intl	11855am	13650am		
1500-1600	China, China Radio Intl	7160as	7405na	9535as	9785as
1500-1600	Ecuador, HCJB	12005am	15115am	21455am	
1500-1600 as	Eqt Guinea, R East Africa	15186af			
1500-1600	Guam, TWR/KTWR	11580as			
1500-1600 a	Ireland,W Coast R Ireland	6175eu			
1500-1525	Israel, Kol Israel	9435eu	11695as	15640ca	
1500-1600 vl	Italy, IRRS	3985va			
1500-1600	Japan, R Japan/NHK World	7200af	7240af	9535na	9750as
		11730af	15355af		
1500-1600	Jordan, Radio	11690eu			
1500-1510	Liberia,LCN/R Liberia Int	5100do			
1500-1600	Malaysia, Radio	7295do			
1500-1600 vl	Malaysia, RTM Kuching	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1530	Mexico, Radio Mexico Intl	9705na			
1500-1530	Mongolia, Voice of	9720as	12085au		
1500-1515 s	Myanmar, Voice of	5990do			
1500-1525	Netherlands, Radio	9890as	12090as	15585as	
1500-1600 occsnal	New Zealand, R NZ Intl	6100pa			
1500-1550	North Korea, R Pyongyang	9325eu	9640eu	9975na	13785me
1500-1530 s	Norway, Radio Norway Intl	9980as	11840as		
1500-1530 as	Palau, KHBN/Voice of Hope	9985as			
1500-1600 vl	Papua New Guinea, NBC	4890do			
1500-1600	Philippines, FEBC/R Intl	11995as			
1500-1526	Romania, R Romania Intl	15335as	17720as		
1500-1600	Russia,Voice of Russia WS	4740va	4940va	4975va	7325va
		7345as	9730va	11775va	11945va
		12025va	12035va	15350va	15430va
		15460va			
1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as			
1500-1545 sm	Seychelles, FEBA Radio	11600as			
1500-1600 mtwhfa	Seychelles, FEBA Radio	9810as			
1500-1530 mt fa	Seychelles, FEBA Radio	11870as			
1500-1600	Singapore,R Corp of Sing	6155do			
1500-1600	United Kingdom, BBC WS	5975as	5990as	6190af	6195as
		9410eu	9515am	9740as	11750as
		11865am	11940af	12095as	15220am
		15400af	15485af	15565va	15575va
		17705af	17830af	17840am	21470af
		21660af			
1500-1530	United Kingdom, BBC WS	11860af	15420af	17880af	21490af
1500-1600	USA, KAIJ Dallas TX	13815am			
1500-1600	USA, KTBN Salt Lk City UT	15590am			
1500-1600	USA, KWHR Naalehu HI	9930as			
1500-1600	USA, Monitor Radio Intl	9355as			
1500-1600	USA, Voice of America	6160as	7125as	7215as	9645as
		9700me	9760as	15205as	15255va
		15395as			
1500-1600	USA, WEWN Birmingham AL	9455na	11875na	15745na	
1500-1600	USA, WGTG McCaysville GA	9400am			
1500-1600	USA, WHRI Noblesville IN	9930am	13760am	15105am	
1500-1600	USA, WJCR Upton KY	7490na			
1500-1600 mtwhf	USA, WRMI/R Miami Intl	9955am			
1500-1600	USA, WRNO New Orleans LA	7355am			
1500-1600 as	USA, WVHA Greenbush ME	15745va			
1500-1600	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1500-1600	USA, WYFR Okeechobee FL	11830na	17750ca		
1500-1600	Zambia, Christian Voice	6065af			
1500-1600 vl	Zambia, R Zambia/ZNBC 1	4910do			
1500-1600 vl	Zambia, R Zambia/ZNBC 2	6165do			
1515-1530 mtwhf	Estonia, Radio	5925eu			
1530-1545	India, All India Radio	3945do	6185do	7140do	7410do
		9530do	9565do	9685do	9700do
		9910do	11740do		
1530-1600	Iran, VOIRI	7215as	9550as		
1530-1600 mtwhf	Sri Lanka, Sri Lanka BC	9730as			
1545-1600 sh	Bangladesh, Bangla Betar	4880do			
1545-1600	Israel, Kol Israel	12080va	15650va		
1545-1600	Pakistan, Radio	9425as	9515as	11570af	11955af
		13590af	15555af		
1550-1600	Vatican State, Vatican R	9940as	11635as		

Selected Programs

Sundays

1500 Canada, RCI Montreal: News. See S 1400.
1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1505 Canada, RCI Montreal: Sunday Morning (3rd hour). See S 1311.
1510 China, China Radio Intl: News about China. See S 0010.
1510 Japan, NHK/Radio: Hello from Tokyo. See S 0110.
1511 Russia, Voice of: Program Preview. See S 0411.
1513 China, China Radio Intl: Sports Beat. See S 1413.
1520 China, China Radio Intl: China Snapshots. See S 1420.
1525 China, China Radio Intl: In the Third World. See S 1425.
1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
1535 China, China Radio Intl: Song of the Week. See S 1435.
1545 China, China Radio Intl: Listeners' Letterbox. See S 1445.

Mondays

1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1510 China, China Radio Intl: News about China. See S 0010.
1511 Russia, Voice of: Moscow Mailbag. See S 0011.
1515 Japan, NHK/Radio: Asian Top News. See M 0115.
1520 China, China Radio Intl: Current Affairs. See M 1420.
1525 Japan, NHK/Radio: Sound of Asia. See M 0125.
1530 China, China Radio Intl: Press Clippings. See M 1430.
1532 Russia, Voice of: This is Russia. See S 0532.
1534 China, China Radio Intl: China's Open Windows. See M 1434.
1539 China, China Radio Intl: Changzhou Reports. See M 1439.
1545 China, China Radio Intl: Idioms and Their Stories. See M 1445.

Tuesdays

1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1511 China, China Radio Intl: News about China. See S 0010.
1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1515 China, China Radio Intl: News Analysis. See T 1415.
1515 Japan, NHK/Radio: Asian Top News. See M 0115.
1515 UK, BBC London (AE): Red Hills of Home (1st,8th). See T 0030.
1519 China, China Radio Intl: Current Affairs. See M 1420.
1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
1533 China, China Radio Intl: Press Clippings. See M 1430.
1538 China, China Radio Intl: Orient Arena. See T 1438.
1545 China, China Radio Intl: Listeners' Letterbox. See S 1445.

Wednesdays

1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1510 China, China Radio Intl: News about China. See S 0010.
1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1515 Japan, NHK/Radio: Asian Top News. See M 0115.
1520 China, China Radio Intl: Current Affairs. See M 1420.
1525 Japan, NHK/Radio: Music Reflections. See W 0125.
1532 Russia, Voice of: This is Russia. See S 0532.
1533 China, China Radio Intl: Press Clippings. See M 1430.
1538 China, China Radio Intl: Profile. See W 1438.
1545 China, China Radio Intl: Learn to Speak Chinese. See W 1445.

Thursdays

1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1510 China, China Radio Intl: News about China. See S 0010.
1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1515 China, China Radio Intl: News Analysis. See T 1415.
1515 Japan, NHK/Radio: Asian Top News. See M 0115.
1519 China, China Radio Intl: Current Affairs. See M 1420.
1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
1534 China, China Radio Intl: Press Clippings. See M 1430.
1538 China, China Radio Intl: Focus. See H 1438.
1544 China, China Radio Intl: Cultural Spectrum. See H 1444.

Fridays

1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1510 China, China Radio Intl: News about China. See S 0010.
1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1515 Japan, NHK/Radio: Asian Top News. See M 0115.
1520 China, China Radio Intl: Current Affairs. See M 1420.
1525 Japan, NHK/Radio: Music Beat. See F 0125.
1532 Russia, Voice of: This is Russia. See S 0532.
1534 China, China Radio Intl: Life in China. See F 1434.
1546 China, China Radio Intl: Global Review. See F 1446.

Saturdays

1500 China, China Radio Intl: News. See S 0000.
1500 Japan, NHK/Radio: News. See S 0000.
1500 Russia, Voice of: News. See S 0000.
1510 China, China Radio Intl: News about China. See S 0010.
1510 Japan, NHK/Radio: Asia Weekly. See A 0110.
1511 Russia, Voice of: Focus on Asia and the Pacific. See T 0011.
1517 China, China Radio Intl: Chinese Folktales. See S 0017.
1523 China, China Radio Intl: The Cooking Show. See S 0023.
1527 China, China Radio Intl: China Scrapbook. See S 0027.
1532 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
1535 China, China Radio Intl: Music from China. See S 0035.

1600 UTC SHORTWAVE GUIDE 12:00 M EDT 9:00 AM PDT

Frequencies

1600-1700	Algeria, R Algiers Intl	11715af	15160me		
1600-1700	Anguilla,Caribbean Beacon	11775am			
1600-1700	Australia, Radio	5995pa	6060pa	6080pa	9580pa
		9615pa	9850pa	9860pa	11660pa
		11800pa	12080pa		
1600-1700 vl	Australia, VL8A Alice Spg	2310do			
1600-1700 vl	Australia, VL8K Katherine	2485do			
1600-1700 vl	Australia, VL8T Tent Crk	2325do			
1600-1610	Bangladesh, Bangla Betar	4880do	15520do		
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFCX Montreal	6005do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1700	China, China Radio Intl	15110af	15130af		
1600-1700 as	Costa Rica, Adv World R	9725am	11870am	13750am	
1600-1627	Czech Rep, Radio Prague	5930eu	17485af		
1600-1700	Ethiopia, Radio	7165af	9560af	11800af	
1600-1700	France, Radio France Intl	11615me	11700af	12015af	15210af
		15460af	15530af		
1600-1650	Germany, Deutsche Welle	6170as	7185af	7225as	9735af
		9875as	11810af	13690as	17800af
1600-1630	Guam, TWR/KTWR	11580as			
1600-1630	Iran, VOIRI	7215as	9550as		
1600-1700 vl	Italy, IRRS	3985va			
1600-1630	Jordan, Radio	11690eu			
1600-1610	Lesotho, Radio Lesotho	4800do			
1600-1700	Malaysia, Radio	7295do			
1600-1650 occsnal	New Zealand, R NZ Intl	6100pa			
1600-1630	Pakistan, Radio	9485af	11565as	11935as	15570af
		15595me			
1600-1700 vl	Papua New Guinea, NBC	4890do			
1600-1700	Russia,Voice of Russia WS	7345as	7440eu	9440af	9595af
		9615af	9635af	9675eu	9730af
		9765af	9775eu	9880af	9975af
		11665me	11675af	11685me	11725me
		11775va	11835va	11850va	11945va
		11985va	12025va	15350va	15400eu
		15430eu	15540va	17875va	
1600-1630	S Africa, Channel Africa	6120af	9685af		
1600-1700	Singapore,R Corp of Sing	6155do			
1600-1700	South Korea, R Korea Intl	5975eu	9515af	9870af	
1600-1700	Swaziland, Trans World R	9500af			
1600-1630	Switzerland, Swiss R Intl	12075as	13635as	15530as	
1600-1640	UAE, Radio Dubai	15395me	17630eu		
1600-1700	United Kingdom, BBC WS	3255af	3915as	5975as	6190af
		7160as	9410eu	11750as	12095eu
		15400af	15485eu	15565me	15575va
		17830af	17840am	21470af	21660af
1600-1615	United Kingdom, BBC WS	5990as	6195as	9515am	9740as
1600-1700	USA, KAIJ Dallas TX	13815am			
1600-1700	USA, KTBN Salt Lk City UT	15590am			
1600-1700	USA, KVOH Los Angeles CA	17775na			
1600-1700	USA, KWHR Naalehu HI	9930as			
1600-1700	USA, Monitor Radio Intl	9385af	11550eu	18930af	
1600-1700	USA, Voice of America	6035af	6110as	6160as	7125as
		7215as	9645as	9700me	9760as
		13600af	13710af	15205va	15225af
		15255va	15395as	15410af	15445af
		17895af			
1600-1700	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1600-1700	USA, WGTG McCaysville GA	9400am			
1600-1700	USA, WHRI Noblesville IN	9930am	13760am	15105am	
1600-1700	USA, WJCR Upton KY	7490na			
1600-1700 smtwhf	USA, WMLK Bethel PA	9465eu			
1600-1700 mtwhf	USA, WRMI/R Miami Intl	9955am			
1600-1700	USA, WRNO New Orleans LA	7355am			
1600-1700	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1600-1700	USA, WYFR Okeechobee FL	11705na	11830na	15695eu	17750eu
		21525af	21745eu		
1600-1610	Vatican State, Vatican R	9940as	11635as		
1600-1630	Vietnam, Voice of	9840af	15010af		
1600-1700	Zambia, Christian Voice	3330af	4965af		
1600-1700 vl	Zambia, R Zambia/ZNBC 1	4910do			
1600-1700 vl	Zambia, R Zambia/ZNBC 2	6165do			
1610-1615	Bangladesh, Bangla Betar	4880do			
1615-1700 as	United Kingdom, BBC WS	9515am	11860af	15420af	
1615-1630	Vatican State, Vatican R	4005eu	5882as	7250as	9645au
		11810pa			
1630-1655	Austria, R Austria Intl	6155eu	9655eu	11855me	13710as
		13730af			
1630-1657	Canada, R Canada Intl	7150as	9550as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Georgia, Radio	6180eu			
1630-1700	Slovakia, Adv World Radio	11600as	13580me		
1630-1700	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1645-1700 irreg	Afghanistan, Radio	7200as			
1645-1700	Tajikistan,Radio Dushanbe	7245as			
1650-1700	Eqt Guinea, Radio Africa	15186af			
1650-1700 mtwhf	New Zealand, R NZ Intl	6145pa			

Selected Programs

Sundays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1606 Germany, Deutsche Welle: Commentary. See S 1106.
1606 Germany, Deutsche Welle: Commentary. See S 1106.
1608 Germany, Deutsche Welle: Arts on the Air. See S 1108.
1608 Germany, Deutsche Welle: Feature of the Month (1). See S 1108.
1609 Germany, Deutsche Welle: Arts on the Air. See S 1108.
1609 Germany, Deutsche Welle: Feature of the Month (1). See S 1108.
1611 Russia, Voice of: Moscow Mailbag. See S 0011.
1632 Russia, Voice of: Timelines. Estelle Winters hosts a variety program with an upbeat flair and an insight into Moscow life.
1633 Germany, Deutsche Welle: German by Radio. See S 1133.
1634 Germany, Deutsche Welle: Africa Highlight. A weekly feature on an important topic concerning Africa.

Mondays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1606 Germany, Deutsche Welle: NewsLink. See M 1106.
1611 Russia, Voice of: Newmarket. See M 1211.
1630 Russia, Voice of: News in Brief. See S 0030.
1632 Russia, Voice of: This is Russia. See S 0532.
1633 Germany, Deutsche Welle: Africa Report. See M 1133.
1633 Germany, Deutsche Welle: Asia-Pacific Report. Correspondent reports, interviews and background news from the Asia-Pacific region.

Tuesdays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1606 Germany, Deutsche Welle: NewsLink. See M 1106.
1611 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
1630 Russia, Voice of: News in Brief. See S 0030.
1632 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
1633 Germany, Deutsche Welle: Africa Report. See M 1133.
1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.

Wednesdays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1606 Germany, Deutsche Welle: NewsLink. See M 1106.
1611 Russia, Voice of: Science and Engineering in the Commonwealth. See S 0511.
1630 Russia, Voice of: News in Brief. See S 0030.
1632 Russia, Voice of: This is Russia. See S 0532.
1633 Germany, Deutsche Welle: Africa Report. See M 1133.
1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.

Thursdays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1606 Germany, Deutsche Welle: NewsLink. See M 1106.
1611 Russia, Voice of: Moscow Mailbag. See S 0011.
1630 Russia, Voice of: News in Brief. See S 0030.
1632 Russia, Voice of: Moscow Yesterday and Today. See S 0432.
1633 Germany, Deutsche Welle: Africa Report. See M 1133.
1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.

Fridays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1606 Germany, Deutsche Welle: NewsLink. See M 1106.
1611 Russia, Voice of: Newmarket. See M 1211.
1630 Russia, Voice of: News in Brief. See S 0030.
1632 Russia, Voice of: Your Top Tune. See S 0232.
1633 Germany, Deutsche Welle: Africa Report. See M 1133.
1633 Germany, Deutsche Welle: Asia-Pacific Report. See M 1633.
1647 Russia, Voice of: You Write to Moscow. See S 0247.

Saturdays

1600 Germany, Deutsche Welle: News. See S 0100.
1600 Germany, Deutsche Welle: News. See S 0100.
1600 Russia, Voice of: News. See S 0000.
1608 Germany, Deutsche Welle: Commentary. See S 1106.
1608 Germany, Deutsche Welle: Commentary. See S 1106.
1611 Russia, Voice of: Music and Musicians. See S 0111.
1612 Germany, Deutsche Welle: Africa in the German Press. What the German newspapers and weeklies have to say about Africa.
1612 Germany, Deutsche Welle: Germany This Week. See A 1112.
1622 Germany, Deutsche Welle: International Talking Point. Journalists discuss major trends and events.
1628 Germany, Deutsche Welle: International Talking Point. See A 1622.
1640 Germany, Deutsche Welle: Religion and Society. See S 0433.
1642 Germany, Deutsche Welle: People and Places. Interviews, stories and music for Africa listeners.

FREQUENCIES

1700-1800	Anguilla,Caribbean Beacon	11775am			
1700-1800	Australia, Radio	6060pa	6080pa	9580pa	9615as
		9860pa	11880pa	12080pa	
1700-1800 vl	Australia, VL8A Alice Spg	2310do			
1700-1800 vl	Australia, VL8K Katherine	2485do			
1700-1800 vl	Australia, VL8T Tent Crk	2325do			
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFCX Montreal	6005do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1800	China, China Radio Intl	7150af	7405af	11910af	
1700-1727	Czech Rep, Radio Prague	5930eu	15640af		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	15210af	15460me		
1700-1800	Japan, R Japan/NHK World	6035na	7110na	7200na	7225na
		9535na	9835na	11730as	11880as
1700-1800 mtwhf	New Zealand, R NZ Intl	6145pa			
1700-1750	North Korea, R Pyongyang	9325eu	9640af	9975af	13785me
1700-1800 vl	Papua New Guinea, NBC	4890do			
1700-1755	Poland, Polish R Warsaw	6000eu	6095eu	7285eu	
1700-1800	Russia,Voice of Russia WS	7440eu	9440af	9615af	9675eu
		9765eu	9775eu	9890af	9975af
		11675af	11685me	11725me	11775va
		11850va	11945va	12025va	15350va
		15400va	17525va	17875va	
1700-1730	S Africa, Channel Africa	11900af			
1700-1730	Slovakia, Adv World Radio	7265as	9475af	15620me	
1700-1730	Spain, R Exterior Espana	9620eu			
1700-1800	United Kingdom, BBC WS	3255af	5975as	6090va	6190af
		6195eu	7160as	9410eu	9510as
		11750as	12095eu	15400af	15420af
		15485eu	15575va	17830af	17840af
1700-1745	United Kingdom, BBC WS	3915as	9630af	11860af	
1700-1800	USA, KAIJ Dallas TX	13815am			
1700-1800	USA, KTBN Salt Lk City UT	15590am			
1700-1800	USA, KWHR Naalehu HI	6120as			
1700-1800	USA, Monitor Radio Intl	9385eu	11550eu	18930af	
1700-1800	USA, Voice of America	6110as	6160as	7125as	7170as
		9645as	9700me	9760af	15255va
		15395as	15445af	17895af	
1700-1800 mtwhf	USA, Voice of America	5990as	6045as	7150as	9550as
		9770as	11870as	11870as	
1700-1800	USA, WEWN Birmingham AL	11875na	13615na	15745eu	
1700-1800	USA, WGTG McCaysville GA	9400am			
1700-1800	USA, WHRI Noblesville IN	9495am	9930am	13760am	
1700-1800	USA, WINB Red Lion PA	15715af			
1700-1800	USA, WJCR Upton KY	7490na			
1700-1800 smtwhf	USA, WMLK Bethel PA	9465eu			
1700-1800 mtwhf	USA, WRMI/R Miami Intl	9955am			
1700-1800	USA, WRNO New Orleans LA	7355am			
1700-1800 mtwhf	USA, WVHA Greenbush ME	11580af			
1700-1800	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1700-1800	USA, WYFR Okeechobee FL	15695eu	21745eu		
1700-1800	Zambia, Christian Voice	3330af	4965af		
1700-1800 vl	Zambia, R Zambia/ZNBC 1	4910do			
1700-1800 vl	Zambia, R Zambia/ZNBC 2	6165do			
1700-1800 vl	Zimbabwe, Zimbabwe BC	4828do			
1730-1800 vl	Cyprus, BRT International	6150do			
1730-1800 mtwhf	Georgia, Radio	6080eu			
1730-1800	Guam, AWR/KSDA	9370as			
1730-1800	Netherlands, Radio	6020af	7120af	11655af	
1730-1740	Pakistan, Radio	4950as			
1730-1756	Romania, R Romania Intl	9550af	11940af	15340af	
1730-1800 mtwh	Swaziland, Trans World R	3200af			
1730-1800	Sweden, Radio	6065eu	13800va		
1730-1800 s	Sweden, Radio	9590eu	13800va		
1730-1759	Vatican State, Vatican R	11625af	15570af	17550af	
1745-1800	Bangladesh, Bangla Betar	7190as	9570eu	15520do	
1745-1800	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935af	13770as	13780do	15075me
1745-1800	Swaziland, Trans World R	3200af			

1800 UTC

1800-1900	Anguilla,Caribbean Beacon	11775am			
1800-1900	Australia, Radio	6080as	7240pa	7330as	9580pa
		9615as	9860pa	11880pa	12080pa
1800-1900 vl	Australia, VL8A Alice Spg	2310do			
1800-1900 vl	Australia, VL8K Katherine	2485do			
1800-1900 vl	Australia, VL8T Tent Crk	2325do			
1800-1900	Bangladesh, Bangla Betar	7190eu	9570as	15520do	
1800-1825 mtwhfa	Belgium, R Vlaanderen Int	5910eu	13645af		
1800-1900	Brazil, Radio Bras	15265eu			
1800-1900	Canada, CFCX Montreal	6005do			
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1900	Georgia, Voice of Hope	9310eu			
1800-1900	India, All India Radio	7410eu	9650eu	9950af	11620af
		11935me	13770as	13780as	15075as
1800-1900 vl	Italy, IRRS	3985va			
1800-1900 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1800-1900	Kuwait, Radio	11990na			
1800-1900 s	Morocco, RTVM Marocaine	17815af			
1800-1900	Mozambique, Radio Maputo	3265af	4855af		
1800-1825	Netherlands, Radio	6020af	7120af	11655af	
1800-1900 mtwhf	New Zealand, R NZ Intl	6145pa			
1800-1830 s	Norway, Radio Norway Intl	7485eu	9590me	15220af	
1800-1900 vl	Papua New Guinea, NBC	4890do			
1800-1900	Russia,Voice of Russia WS	7290af	7350af	7440eu	9440af
		9775af	9785af	9880eu	9945eu
		9975eu	11675eu	11775va	15400eu
		17875eu			
1800-1900	Sudan, Radio Omdurman	9200af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	United Kingdom, BBC WS	3255af	6180eu	6190af	6195eu
		9410va	12095eu	15400af	15420af
		15485va	15575va	17830af	
1800-1830	United Kingdom, BBC WS	5975as	6090va	9510as	21490af
1800-1900	USA, KAIJ Dallas TX	13815am			
1800-1900	USA, KJES Mesquite NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590am			
1800-1900	USA, KWHR Naalehu HI	13625au			
1800-1900	USA, Monitor Radio Intl	9355eu	9385af	13770eu	15665eu
		18930af			
1800-1900	USA, Voice of America	7415af	9760af	11975af	15410af
		15580af	17895af		
1800-1900	USA, WEWN Birmingham AL	11875na	13615na	15375sa	15745na
1800-1900	USA, WGTG McCaysville GA	9400am			
1800-1900	USA, WHRI Noblesville IN	9495am	13625am	13760eu	
1800-1900	USA, WINB Red Lion PA	15715af			
1800-1900	USA, WJCR Upton KY	7490na			
1800-1900 smtwhf	USA, WMLK Bethel PA	9465eu			
1800-1900 as	USA, WRMI/R Miami Intl	9955am			
1800-1900	USA, WRNO New Orleans LA	7355am			
1800-1900 smtwhf	USA, WVHA Greenbush ME	15715af			
1800-1900	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1800-1900	USA, WYFR Okeechobee FL	15695eu	17555eu		
1800-1827	Vietnam, Voice of	9840eu	15010eu		
1800-1900	Yemen, Yemeni Rep Radio	9780do			
1800-1900	Zambia, Christian Voice	3330af	4965af		
1800-1900 vl	Zambia, R Zambia/ZNBC 1	4910do			
1800-1900 vl	Zambia, R Zambia/ZNBC 2	6165do			
1800-1900 vl	Zimbabwe, Zimbabwe BC	4828do			
1805-1830	Malawi, MBC	5993do			
1825-1900 vl	Cyprus, BRT International	6150do			
1830-1900 t	Belarus, Radiosta Belarus	6010eu	7105eu	7205eu	7210eu
1830-1900	Georgia, Radio	11910eu			
1830-1900	Netherlands, Radio	6020af	7120af	9895af	11655af
		15315af	17605af		
1830-1900 w	Saipan, FEBC/KFBS	9465as			
1830-1900 a	Serbia, Radio Yugoslavia	6100eu	9720af		
1830-1900	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu	
1830-1835	Somalia, Radio Mogadishu	6732do			
1830-1900	Turkey, Voice of	9445eu	13695na		
1830-1900	United Kingdom, BBC WS	6005af	9630af		
1830-1900	USA, Voice of America	7170as	7330af	9860af	
1833-1900	Cote D' Ivoire, RDTV	11920do			
1840-1850	Greece, Voice of	11645af	15150af		
1845-1900	Albania, R Tirana Intl	7270eu	9570eu		
1845-1900 mtwhf	Armenia, Voice of	4810me	4990eu		
1845-1900 irreg s	Mali, RDTV Malienne	4783do	4835do	5995do	

Hello, Writers...

Do you have a topic you've always "thought about" writing up for Monitoring Times? Now is the time! Given our full-spectrum coverage, plus the interest in new technology on the one hand and nostalgia for the past on the other, there is no limit to appropriate subject matter to write about. Bone up on your research, warm up your pen, and you, too, can earn a little spending money!

Pitch your idea to the editor at mteditor@grove.net or call 704-837-9200 and ask for Rachel. Writer's Guidelines are available on the MT homepage at www.grove.net, or for an SASE.

FREQUENCIES

1900-2000	Anguilla,Caribbean Beacon	11775am			
1900-2000 m-f/vl	Argentina, RAE	15345eu			
1900-2000	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9615as	9860pa	11880pa	12080pa
1900-2000 vl	Australia, VL8A Alice Spg	2310do			
1900-2000 vl	Australia, VL8K Katherine	2485do			
1900-2000 vl	Australia, VL8T Tent Crk	2325do			
1900-1920	Brazil, Radio Bras	15265eu			
1900-2000	Bulgaria, Radio	9700eu	11720eu		
1900-2000	Canada, CFCX Montreal	6005do			
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-2000	China, China Radio Intl	9440af	11515af		
1900-2000	Costa Rica,RF Peace Intl	15050am			
1900-1930	Cote D' Ivoire, RDTV	11920do			
1900-2000 vl	Cyprus, BRT International	6150do			
1900-2000	Ecuador, HCJB	12015am	21455am		
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1930 m	Estonia, Radio	5925eu			
1900-2000	Georgia, Voice of Hope	9310eu			
1900-1950	Germany, Deutsche Welle	7250af	9640af	9670af	9735af
		11785af	11810af	13790af	
1900-2000	Guatemala, Adv World R	5980am			
1900-1930	Hungary, Radio Budapest	3975eu	7155eu	9755eu	
1900-1945	India, All India Radio	7410eu	9650eu	9950me	11620eu
		11935af	13770as	13780as	15075as
1900-2000 h	Ireland,W Coast R Ireland	15625af			
1900-1925	Israel, Kol Israel	7465na	9435na	11605va	15640au
1900-2000 vl	Italy, IRRS	3985va			
1900-2000 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
1900-2000	Kuwait, Radio	11990eu			
1900-1930 as	Latvia, Radio	5935eu			
1900-1915	Liberia,LCN/R Liberia Int	5100do			
1900-1930	Mexico, Radio Mexico Intl	9705na			
1900-2000	Netherlands, Radio	6020af	7120af	9895af	11655af
		15315af	17605af		
1900-1951 mtwh	New Zealand, R NZ Intl	6145pa			
1900-2000	Nigeria, Voice of	7255af			
1900-2000 vl	Papua New Guinea, NBC	4890do			
1900-2000	Romania, R Romania Intl	7105af	7195eu	9550eu	9690eu
		11810eu	11940af		
1900-2000	Russia,Voice of Russia WS	7250af	7295af	7350af	7370eu
		7440eu	9440af	9620af	9665af
		9710eu	9740af	9775af	9795eu
		9880af	9890eu	9945af	11675eu
		11765va	13670af	15400eu	17875va
1900-2000	South Korea, R Korea Intl	5975eu	7275as		
1900-2000	Swaziland, Trans World R	3200af			
1900-2000	Thailand, Radio	7210eu	9535eu	9655eu	11905eu
1900-1930	Turkey, Voice of	9445eu	13695na		
1900-2000	United Kingdom, BBC WS	3255af	6005af	6180eu	6190af
		6195va	9410af	9630af	9740as
		12095eu	15400af	15485va	15575va
		17830af			
1900-2000	USA, KAIJ Dallas TX	13815am			
1900-2000	USA, KTBN Salt Lk City UT	15590am			
1900-2000	USA, KWHR Naalehu HI	13625au			
1900-2000	USA, Monitor Radio Intl	9355eu	9385af	13770eu	15665eu
		17510af			
1900-2000	USA, Voice of America	6035af	7325af	7415af	9525pa
		9760af	11870pa	11975af	15180pa
		15410af	15445af	15580af	
1900-1930 s	USA, Voice of America	4950af			
1900-2000	USA, WEWN Birmingham AL	15375sa	15745na		
1900-2000	USA, WGTG McCaysville GA	9400am			
1900-2000	USA, WHRI Noblesville IN	9495am	13625am	13760eu	
1900-2000	USA, WINB Red Lion PA	15715eu			
1900-2000	USA, WJCR Upton KY	7490na			
1900-2000 smtwhf	USA, WMLK Bethel PA	9465eu			
1900-2000	USA, WRMI/R Miami Intl	9955am			
1900-2000	USA, WRNO New Orleans LA	7355am			
1900-2000 mtwhfa	USA, WVHA Greenbush ME	15715af			
1900-2000	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
1900-2000	USA, WYFR Okeechobee FL	17555af			
1900-1927	Vietnam, Voice of	9840eu	15010eu		
1900-2000	Zambia, Christian Voice	3330af	4965af		
1900-2000 vl	Zambia, R Zambia/ZNBC 1	4910do			
1900-2000 vl	Zambia, R Zambia/ZNBC 2	6165do			
1900-2000 vl	Zimbabwe, Zimbabwe BC	4828do			
1910-1955	Germany, VO Mediterranean	12060eu			
1930-2000	Georgia, Radio	11760eu			
1930-2000	Iran, VOIRI	7260af	9022eu		
1930-2000	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
1930-2000	Sweden, Radio	6065eu			
1930-2000	United Kingdom, BBC WS	11835af			
1935-1955	Italy, RAI Intl	6015eu	7230eu	9670eu	
1950-2000	Vatican State, Vatican R	4005eu	5882eu	7250eu	9645eu
1952-2000	New Zealand, R NZ Intl	9845pa			
2000-2100	Algeria, R Algiers Intl	11715af			
2000-2100	Angola, Radio Nacional	3355do	9535do		
2000-2100	Anguilla,Caribbean Beacon	11775am			
2000-2100	Australia, Radio	6080pa	7240pa	7330as	9580pa
		9860pa	11880pa	12080pa	
2000-2100 vl	Australia, VL8A Alice Spg	2310do			
2000-2100 vl	Australia, VL8K Katherine	2485do			
2000-2100 vl	Australia, VL8T Tent Crk	2325do			
2000-2100	Canada, CFCX Montreal	6005do			
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	Canada, R Canada Intl	5995va	7235eu		
2000-2100	Canada, R Canada Intl	11690af	13650af	13670af	15150af
		15325af	17820af	17870af	
2000-2100	China, China Radio Intl	6950eu	7160af	9440af	9730na
		9920eu	11715af	15110af	
2000-2100	Costa Rica, RF Peace Intl	15050am			
2000-2100 vl	Cyprus, BRT International	6150do			
2000-2027	Czech Rep, Radio Prague	5930eu	11600au		
2000-2100	Ecuador, HCJB	11960eu	21455am		
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2030	Finland, YLE/R Finland	6120eu	9855eu		
2000-2007	Georgia, Voice of Hope	9310eu			
2000-2050	Germany, Deutsche Welle	7170eu			
2000-2030	Ghana, Ghana Broadc Corp	3366do	4915do		
2000-2010	Greece, Voice of	7430eu	9380eu		
2000-2100	Guatemala, Adv World R	5980am			
2000-2100	Indonesia, Voice of	9525as			
2000-2030	Iran, VOIRI	7260af	9022eu		
2000-2100 vl	Italy, IRRS	3955va			
2000-2100 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2000-2100	Kuwait, Radio	11990eu			
2000-2100	Malta, VO Mediterranean	7440eu	12060eu		
2000-2030	Mexico, Radio Mexico Intl	9705na			
2000-2025	Netherlands, Radio	6020af	7120af	9895af	11655af
		15315af	17605af		
2000-2051 smtwh	New Zealand, R NZ Intl	9845pa			
2000-2058 a	New Zealand, R NZ Intl	9845pa			
2000-2005	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2000-2050	North Korea, R Pyongyang	6575eu	9345as	9640af	9975as
2000-2100 vl	Papua New Guinea, NBC	4890do			
2000-2025	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	
2000-2030 mtwhf	Portugal, R Portugal Intl	7110eu	9780eu	9815eu	
2000-2100	Russia,Voice of Russia WS	7350eu	7370eu	7440eu	9620eu
		9665eu	9775eu	9880eu	11675eu
2000-2015	Sierra Leone, SLBS	3316do			
2000-2100	Slovakia, Adv World Radio	6055eu			
2000-2015 irreg	Somalia, Radio Mogadishu	6870af			
2000-2100 mtwhf	Spain, R Exterior Espana	6125eu	11775af		
2000-2015	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	9885af	12075af	13635af	
2000-2015	Uganda, Radio	4976do			
2000-2100	United Kingdom, BBC WS	3255af	5975as	6005af	6180eu
	6190af 6195va	9410eu	9630af	11750am	11835af
	12095eu 15400af	15485af	15575va	17830af	
2000-2100	USA, KAIJ Dallas TX	13815am			
2000-2100	USA, KTBN Salt Lk City UT	15590am			
2000-2100	USA, KWHR Naalehu HI	15405as			
2000-2100	USA, Monitor Radio Intl	9355eu	11550eu	11860pa	13770eu
		15665eu			
2000-2030	USA, Voice of America	4950af	6035af	7375af	7415af
	9760af 9770af	11855af	11975af	15410af	15445af
	15580af 17725af	17755af			
2000-2100	USA, WEWN Birmingham AL	6890na	13615na	15375sa	15745na
2000-2100	USA, WGTG McCaysville GA	9400am			
2000-2100	USA, WHRI Noblesville IN	9495am	13760eu	15405eu	
2000-2100	USA, WINB Red Lion PA	13790eu			
2000-2100	USA, WJCR Upton KY	7490na			
2000-2100 smtwhf	USA, WMLK Bethel PA	9465eu			
2000-2100	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	7355am			
2000-2100 mtwhfa	USA, WVHA Greenbush ME	13695va			
2000-2100	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2000-2100	USA, WYFR Okeechobee FL	7355eu	11580eu	17555eu	17845af
		21525af			
2000-2010	Vatican State, Vatican R	4005eu	5882eu	7250eu	9645eu
2000-2030	Vatican State, Vatican R	7365af	9660af	11625af	
2000-2100	Zambia, Christian Voice	3330af	4965af		
2000-2100 vl	Zambia, R Zambia/ZNBC 2	6165do			
2000-2100 vl	Zimbabwe, Zimbabwe BC	4828do			
2005-2100	Syria, Radio Damascus	12085na	13610eu		
2015-2030	Namibia, NBC	3270do	3290do		
2025-2045	Italy, RAI Intl	7120na	9710na	11840na	
2025-2035 mtwhf	Latvia, Radio	5935eu			
2030-2100	Armenia, Voice of	7480eu	9965eu		
2030-2100	Cuba, Radio Havana	13715eu	13725eu		
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Germany,Adventist World R	9830eu			
2030-2100	Slovakia, Adv World Radio	11610af			
2030-2100	Sweden, Radio	6065as	13625as		
2030-2045	Thailand, Radio	9655eu	9680eu	11905eu	
2030-2100 as	USA, Voice of America	4950af			
2030-2057	Vietnam, Voice of	9840eu	12020eu	15010eu	
2045-2100	India, All India Radio	7150eu	7410eu	9910au	9950eu
		11620eu	11715pa		
2052-2100 smtwh	New Zealand, R NZ Intl	11735pa			
2059-2100 a	New Zealand, R NZ Intl	11735pa			

FREQUENCIES

2100-2130	Albania, R Tirana Intl	7110eu	9515eu		
2100-2200	Anguilla,Caribbean Beacon	11775am			
2100-2200	Australia, Radio	7240pa	9660pa	9850pa	11695pa
		11855as	12080pa	13605pa	
2100-2130	Australia, Radio	6080pa	9860as	11880pa	
2100-2130 vl	Australia, VL8A Alice Spg	2310do			
2100-2130 vl	Australia, VL8K Katherine	2485do			
2100-2200 vl	Australia, VL8K Katherine	5025do			
2100-2130 vl	Australia, VL8T Tent Crk	2325do			
2100-2200 vl	Australia, VL8T Tent Crk	4910do			
2100-2125	Belgium, R Vlaanderen Int	5910eu			
2100-2200	Bulgaria, Radio	9700eu	11720eu		
2100-2115 vl	Cameroon, Radio Cameroon	4850do			
2100-2200 vl	Cameroon, Radio Garoua	5010do			
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFCX Montreal	6005do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2130	Canada, R Canada Intl	11690af	13650af	13670af	15150af
		15325af	17820af		
2100-2130 mtwhf	Canada, R Canada Intl	5995eu	7235eu		
2100-2200	China, China Radio Intl	6950eu	9920af		
2100-2130	China, China Radio Intl	11715af	15110af		
2100-2130	China, China Radio Intl	3985eu			
2100-2200	Costa Rica, RF Peace Intl	15050am			
2100-2130	Cuba, Radio Havana	13715eu	13725eu		
2100-2200 vl	Cyprus, BRT International	6150do			
2100-2200	Ecuador, HCJB	11990eu	21455am		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2150	Germany, Deutsche Welle	7115au	9670as	9735af	9765as
		11785au	11865af	15135af	
2100-2130	Germany,Adventist World R	9830af			
2100-2130	Hungary, Radio Budapest	3975eu	7250eu	9835eu	
2100-2200	India, All India Radio	7150eu	7410eu	9910eu	9950eu
		11620au	11715au		
2100-2200 vl	Italy, IRRS	3955va			
2100-2200	Japan, R Japan/NHK World	6035as	9535na	13630as	
2100-2107 vl	Kenya, Kenya Broadc Corp	4885do	4935do	6150do	
2100-2200	Lebanon, Voice of Hope	9960va			
2100-2115	Liberia,LCN/R Liberia Int	5100do			
2100-2107	Namibia, NBC	3270do	3290do		
2100-2200 smtwha	New Zealand, R NZ Intl	11735pa			
2100-2106 f	New Zealand, R NZ Intl	9845pa			
2100-2200	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2100-2200	Nigeria, Voice of	7255af			
2100-2200 vl	Papua New Guinea, NBC	4890do			
2100-2156	Romania, R Romania Intl	7105eu	7195eu	9690eu	11810eu
2100-2200	Russia,Voice of Russia WS	7250eu	7350eu	7370eu	7440eu
		9620eu	9655eu	9665eu	9710eu
		9740eu	9765eu	9775eu	9880eu
		11840eu			
2100-2130	Serbia, Radio Yugoslavia	6100eu	6185eu		
2100-2200	South Korea, R Korea Intl	6480eu	15575eu		
2100-2130	South Korea, R Korea Intl	3970eu			
2100-2200 as	Spain, R Exterior Espana	6125eu	11775af		
2100-2105	Syria, Radio Damascus	12085na	13610eu		
2100-2110	Uganda, Radio	4976do			
2100-2200	Ukraine, R Ukraine Intl	5905eu	6010eu	6020eu	6090eu
		7180eu	7240eu	7380na	9550na
		9560na	9640na	12040na	13590na
		13720sa			
2100-2200	United Kingdom, BBC WS	3255af	3915as	3955eu	5965as
		5975as	6005af	6180eu	6190af
		6195va	7325va	9410eu	9630va
		11750sa	11835af	11945as	12095eu
		15400af			
2100-2130	United Kingdom, BBC WS	9630af	15485af		
2100-2145	United Kingdom, BBC WS	11680sa			
2100-2200	USA, KAIJ Dallas TX	13815am			
2100-2200	USA, KTBN Salt Lk City UT	15590am			
2100-2200	USA, Monitor Radio Intl	9355am	11550eu	13770eu	13840au
		15665eu			
2100-2200	USA, Voice of America	6035af	6040me	7375af	7415af
		9535af	9760eu	11870pa	11975af
		15185as	15410af	15445af	15580af
		17725af	17735as		
2100-2200	USA, WEWN Birmingham AL	13615na	15375sa	15745eu	
2100-2200	USA, WGTG McCaysville GA	9400am			
2100-2200	USA, WHRI Noblesville IN	5745am	9495am	15405eu	
2100-2200	USA, WINB Red Lion PA	13790eu			
2100-2200	USA, WJCR Upton KY	7490na			
2100-2200	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	7355am			
2100-2200 smtwhf	USA, WVHA Greenbush ME	13695af			
2100-2200	USA, WWCR Nashville TN	9475am	12160am	13845am	15685am
2100-2200	USA, WYFR Okeechobee FL	17555eu	17845af	21525eu	
2100-2200	Zambia, Christian Voice	3330af	4965af		
2100-2200 vl	Zambia, R Zambia/ZNBC 1	4910do			
2100-2200 vl	Zambia, R Zambia/ZNBC 2	6165do			
2100-2200 vl	Zimbabwe, Zimbabwe BC	4828do			
2108-2200 f	New Zealand, R NZ Intl	11735pa			
2115-2200	Egypt, Radio Cairo	9900eu			
2115-2130	United Kingdom, BBC WS	6175am	15390am	17715am	
2130-2200	Australia, Radio	13755pa	17795pa	17860pa	
2130-2155	Austria, R Austria Intl	5945eu	6155eu	13730af	
2130-2157	Czech Rep, Radio Prague	11600af			
2130-2200	Ghana, Ghana Broadc Corp	3366do			
2130-2200	Guam, AWR/KSDA	15310as			
2130-2200	Iran, VOIRI	6165au	6175au		
2130-2200	Sweden, Radio	6065eu	9430af		
2130-2200	Uzbekistan, R Tashkent	9540as	9545me		
2145-2200 a	Greece, Voice of	7480au	9425au		

2200 UTC

2200-2300	Anguilla,Caribbean Beacon	6090am			
2200-2300	Australia, Radio	11695pa	11855as	13755pa	15365pa
		17795pa	17860pa		
2200-2300 vl	Australia, VL8K Katherine	5025do			
2200-2300 vl	Australia, VL8T Tent Crk	4910do			
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFCX Montreal	6005do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2230	Canada, R Canada Intl	5960eu	9755am	11705as	13670am
		13740am	15305am		
2200-2300	China, China Radio Intl	9880eu			
2200-2300	Costa Rica,RF Peace Intl	7385am	15050am		
2200-2210	Croatia, Croatian Radio	5895eu	7370eu		
2200-2245	Egypt, Radio Cairo	9900eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana Broadc Corp	4915do			
2200-2230	India, All India Radio	7150eu	7410eu	9910eu	9950eu
		11620au	11715au		
2200-2230	Iran, VOIRI	6165au	6175au		
2200-2225	Italy, RAI Intl	6150as	9565as	11815pa	
2200-2300	Lebanon, Voice of Hope	9960va			
2200-2215	Liberia,LCN/R Liberia Int	5100do			
2200-2300	Malaysia, Radio	7295do			
2200-2225	Moldova, R Moldova Intl	7520eu			
2200-2300 fa	New Zealand, R NZ Intl	11735pa			
2200-2215	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2200-2230 s	Norway, Radio Norway Intl	9965sa			
2200-2300 vl	Papua New Guinea, NBC	9675do			
2200-2300	Russia,Voice of Russia WS	7105na	7250na	9620na	9655na
		9665na			
2200-2215	Sierra Leone, SLBS	3316do			
2200-2300	Slovakia, Adv World Radio	6055af			
2200-2300	Taiwan, VO Free China	15600eu	17750eu		
2200-2300	Turkey, Voice of	6135eu	7280eu	9560na	9655na
2200-2300	United Kingdom, BBC WS	5965as	5975am	6175am	6180eu
		6195as	7325va	9410va	9590am
		9660as	9890as	9915am	11750am
		11835af	11955as	12080as	15400af
2200-2230	United Kingdom, BBC WS	12095eu			
2200-2300	USA, KAIJ Dallas TX	13815am			
2200-2300	USA, KTBN Salt Lk City UT	15590am			
2200-2300	USA, Monitor Radio Intl	7510eu	13770sa	15665as	
2200-2300	USA, Voice of America	7215as	9705as	9770as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2200-2230 mtwhf	USA, Voice of America	6035af	7340af	7375af	7415af
		11975af			
2200-2300	USA, WEWN Birmingham AL	6890na	9975eu	13615na	15375sa
		15745eu			
2200-2300	USA, WGTG McCaysville GA	5085am			
2200-2300	USA, WHRI Noblesville IN	5745am	9495am	17510am	
2200-2300	USA, WINB Red Lion PA	13790am			
2200-2300	USA, WJCR Upton KY	7490na			
2200-2300	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	7355am			
2200-2300 s	USA, WVHA Greenbush ME	5850eu			
2200-2300	USA, WWCR Nashville TN	7435am	9475am	12160am	13845am
2200-2300	USA, WYFR Okeechobee FL	17845af	21525af		
2200-2300 vl	Zambia, R Zambia/ZNBC 1	4910do			
2230-2300	Canada, R Canada Intl	5960am	9755am	13670am	
2230-2300	Cuba, Radio Havana	6000na			
2230-2227	Czech Rep, Radio Prague	7345na	11600na		
2230-2255	Moldova, R Moldova Intl	7520eu			
2240-2250	Greece, Voice of	7480au	9425au		
2245-2300	Ghana, Ghana Broadc Corp	3366do	4915do		
2245-2300	India, All India Radio	7170as	9705as	9950as	11620as
2245-2300	Vatican State, Vatican R	7305as	9600as	11830au	

2300 UTC SHORTWAVE GUIDE

7:00 PM EDT
4:00 PM PDT

Frequencies

2300-0000	Anguilla,Caribbean Beacon	6090am			
2300-0000	Australia, Radio	9660pa	11695as	12080pa	13755as
		15365pa	17795pa	17860pa	
2300-0000 vl	Australia, VL8K Katherine	5025do			
2300-0000 vl	Australia, VL8T Tent Crk	4910do			
2300-0000	Bulgaria, Radio	7480na	9435na		
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFCX Montreal	6005do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-0000 mtwhf	Canada, R Canada Intl	9755am	11940am	13670am	15305am
2300-0000 as	Canada, R Canada Intl	5960am	9755am	11940am	13670am
		15305am			
2300-0000	Costa Rica, Adv World R	5030am	6150am	9725am	13750am
		15460am			
2300-0000	Costa Rica,RF Peace Intl	7385am			
2300-2310	Croatia, Croatian Radio	5895eu	7370eu		
2300-2330	Cuba, Radio Havana	6000na			
2300-0000	Egypt, Radio Cairo	9900na			
2300-2350	Germany, Deutsche Welle	5980as	7235as	9690as	
2300-0000	Guam, AWR/KSDA	11775as			
2300-0000	Guatemala, Adv World R	11775am			
2300-0000	India, All India Radio	7170as	9705as	9950as	11620as
2300-0000	Lebanon, Voice of Hope	9960va			
2300-2315	Liberia,LCN/R Liberia Int	5100do			
2300-0000	Malaysia, Radio	7295do			
2300-2306	New Zealand, R NZ Intl	11735pa			
2300-2315	Nigeria, FRCN/Radio	3326do	4770do	4990do	
2300-2325	North Korea, R Pyongyang	11700na	13650na		
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-2356	Romania, R Romania Intl	5990na	6155na	9510na	9570na
		11940na			
2300-0000	Russia,Voice of Russia WS	7105na	7125na	9665na	
2300-0000	Turkey, Voice of	6135na	7280eu	9655na	
2300-0000	United Kingdom, BBC WS	3915as	5965as	5975am	6175am
		9580as	9590na	9915am	11750sa
		11945as	11955as	15380as	
2300-2315	United Kingdom, BBC WS	15400af			
2300-0000	USA, KAIJ Dallas TX	13815am			
2300-0000	USA, KTBN Salt Lk City UT	15590am			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Monitor Radio Intl	7510af	13625as	13770sa	15665sa
2300-0000	USA, Voice of America	7215as	9705as	9770as	11760as
		15185as	15290as	15305as	17735as
		17820as			
2300-0000	USA, WEWN Birmingham AL	6890na	9975na	13615na	
2300-0000	USA, WGTG McCaysville GA	9400am			
2300-0000	USA, WHRI Noblesville IN	5745am	9495am	17510am	
2300-0000	USA, WINB Red Lion PA	13790am			
2300-0000	USA, WJCR Upton KY	7490na			
2300-0000	USA, WRMI/R Miami Intl	9955am			
2300-0000	USA, WRNO New Orleans LA	7355am			
2300-0000 mtwhf	USA, WVHA Greenbush ME	9900af			
2300-0000	USA, WWCR Nashville TN	5070am	7435am	9475am	13845am
2307-0000	New Zealand, R NZ Intl	15115pa			
2330-0000	Australia, Radio	13605pa	17880pa		
2330-2355	Belgium, R Vlaanderen Int	9925sa	11690am		
2330-0000 vl	Ghana, Ghana Broadc Corp	4915af			
2330-0000	Iraq, Radio Iraq Intl	6050eu	11890eu		
2330-0000	Netherlands, Radio	6020na	6165na	9845na	
2335-2345	Greece, Voice of	9395sa	9425sa	9935sa	11595sa
2335-2345	Sierra Leone, SLBS	3316do			

Selected Programs

Sundays

2300 Canada, RCI Montreal: CBC Radio News. See S 1200.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2307 Canada, RCI Montreal: Tapestry. A look at the broad range of spiritual and human issues facing people of various cultures and religions.
2308 Germany, Deutsche Welle: Inside Europe. See S 0109.
2311 Russia, Voice of: News and Views. See S 0311.
2332 Russia, Voice of: Folk Box. One of the top ten entertainment programs (Passport to World Band Radio).
2333 Germany, Deutsche Welle: Hits in Germany. See S 0438.
2335 Belgium, R Vlaanderen Intl: Radio World. See S 0635.
2345 Belgium, R Vlaanderen Intl: PO Box 26. See S 0645.
2355 Belgium, R Vlaanderen Intl: Music. Popular music wraps up this edition of the broadcast.

Mondays

2300 Canada, RCI Montreal: The World at Six. CBC radio's major newscast of the day, presenting the important stories in depth and in context.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2306 Germany, Deutsche Welle: NewsLink. See M 1106.
2332 Russia, Voice of: Yours for the Asking. A 30-minute musical request program.
2333 Germany, Deutsche Welle: Headcrash (1). See M 0233.
2333 Germany, Deutsche Welle: Made in Germany (4). See M 0233.
2333 Germany, Deutsche Welle: MediaMag (3). See M 0233.
2333 Germany, Deutsche Welle: Science and Technology (2). See M 0233.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2344 Belgium, R Vlaanderen Intl: Focus on Europe. A report on happenings in the European Economic Community (ECC).
2349 Belgium, R Vlaanderen Intl: Sports Report. A roundup of the results of seasonal sports activities.

Tuesdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2306 Germany, Deutsche Welle: NewsLink. See M 1106.
2311 Russia, Voice of: News and Views. See S 0311.
2332 Russia, Voice of: Your Top Tune. See S 0232.
2333 Germany, Deutsche Welle: Man and Environment. See T 0133.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2340 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2345 Belgium, R Vlaanderen Intl: Living in Belgium. Belgian lifestyles and activities.
2347 Russia, Voice of: You Write to Moscow. See S 0247.
2349 Belgium, R Vlaanderen Intl: Green Society. Environmental issues facing Belgium.

Wednesdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2306 Germany, Deutsche Welle: NewsLink. See M 1106.
2311 Russia, Voice of: News and Views. See S 0311.
2332 Russia, Voice of: Music at Your Request. See M 1132.
2333 Germany, Deutsche Welle: Insight. See W 0133.
2334 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2344 Belgium, R Vlaanderen Intl: Around Town. Current happenings in Brussels and other centers of culture.
2349 Belgium, R Vlaanderen Intl: The Arts. See M 0645.

Thursdays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2306 Germany, Deutsche Welle: NewsLink. See M 1106.
2311 Russia, Voice of: News and Views. See S 0311.
2332 Russia, Voice of: The Jazz Show. See M 0432.
2333 Germany, Deutsche Welle: Living in Germany. See H 0133.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2344 Belgium, R Vlaanderen Intl: International Report. A background report on current affairs in Europe and elsewhere.
2349 Belgium, R Vlaanderen Intl: Economics. Interview with a person in the field of business, finance, or consumerism or a updating report.

Fridays

2300 Canada, RCI Montreal: The World at Six. See M 2300.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2306 Germany, Deutsche Welle: NewsLink. See M 1106.
2311 Russia, Voice of: News and Views. See S 0311.
2332 Russia, Voice of: Folk Box. See S 2332.
2333 Germany, Deutsche Welle: Spotlight on Sport. See F 0233.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Belgium Today. See M 0641.
2342 Belgium, R Vlaanderen Intl: Tourism. See M 0651.
2347 Belgium, R Vlaanderen Intl: The Arts. See M 0645.

Saturdays

2300 Canada, RCI Montreal: CBC Radio News. See S 1200.
2300 Germany, Deutsche Welle: News. See S 0100.
2300 Russia, Voice of: News. See S 0000.
2305 Canada, RCI Montreal: Quirks and Quarks. See S 1206.
2309 Germany, Deutsche Welle: Sports Report. See S 0106.
2311 Russia, Voice of: News and Views. See S 0311.
2312 Germany, Deutsche Welle: Development Forum (biweekly). See S 0212.
2312 Germany, Deutsche Welle: Women on the Move (biweekly). See S 0212.
2332 Russia, Voice of: This is Russia. See S 0532.
2333 Germany, Deutsche Welle: Mailbag Asia. See S 0216.
2335 Belgium, R Vlaanderen Intl: Press Review. See M 0635.
2339 Belgium, R Vlaanderen Intl: Music from Flanders. See A 0640.

NEAR VERTICAL INCIDENCE SKYWAVE

By Jacques d'Avignon
monitor@rac.ca

When talking about radio transmissions in the HF bands, it is always assumed that these transmissions are made for long range communications using the multihop skywave propagation mode. Most textbooks always discuss the use of the HF for medium to long range circuits, and we regard that portion of the spectrum between 1.5 and 30 MHz to be of use to reach stations that cannot be reached by VHF/UHF.

However, very seldom do we think and look at what system we could use to communicate in the geographical area where the VHF/UHF systems can no longer reach, but which lies inside the HF skip zone that encircles every HF transmitter.

In the normal use of HF, a skip zone always occurs between the termination of the ground wave radiation from the transmitter and the first return to earth of the skywave component of the transmission. This zone also covers an area which, under normal propagation conditions, VHF/UHF systems cannot access — the two terminals not being within line of sight of each other.

There is an HF propagation mode that is used in commercial and military operations that can fill this gap in our communications capabilities. Unfortunately, it doesn't appear to be discussed or explained very often. This forgotten HF propagation mode is called NVIS, Near Vertical Incidence Skywave.

You may find NVIS mentioned in literature under other names, such as "Showerhead Propagation Mode." I have also seen it called the "Jungle Broadcasting Mode." This last name must have been derived from the tropical broadcasting stations which use this technique to reach their scattered audiences.

The term "showerhead" suggests a simple experiment by which you can see for yourself how NVIS works. When you water your garden, point your hose straight up inside an umbrella, and look at the water coming back down. See how much it disperses in a large area compared to the size of the hose nozzle! (I recommend you wear a bathing suit when attempting this experiment, or I won't be held responsible!)

The Australians call this "District Propagation Mode" in their propagation forecasting software, ASAPS. In Australia, a "district" is an administrative entity smaller than a province or a state, and the term describes the area of coverage by this type of propagation.

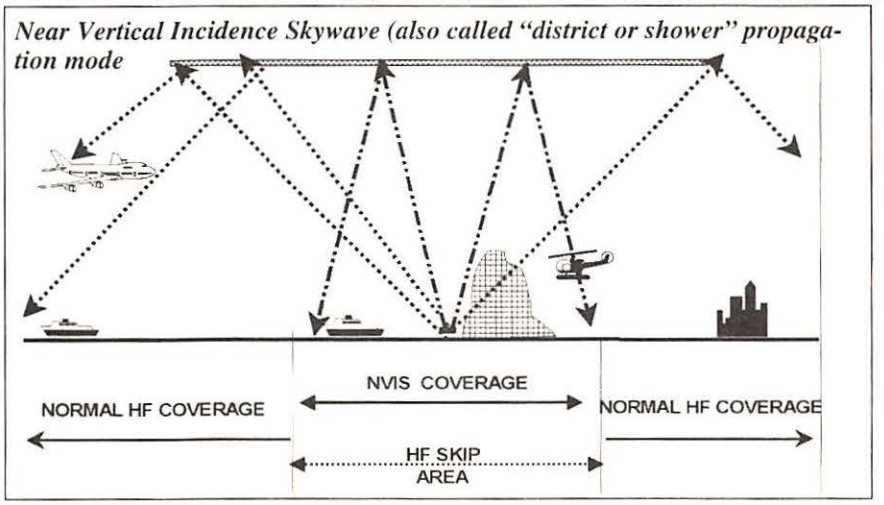
Next month we will see how NVIS propagation is used for broadcasting in the tropical band. Good DX, and make sure that your antenna is well protected from lightning before the summer arrives.

OPTIMUM WORKING FREQUENCIES (MHz)

For the Period 15 July to 14 August 1997 Flux=81 SSN=18

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TO/FROM US WEST COAST																								
SOUTH AMERICA	19	16	15	15	15	13	12	11	11	10	9	10	11	12	14	16	16	17	17	18	18	19	19	19
WESTERN EUROPE	11	10	9	9	9	9	10	9	8	0	0	0	0	11	13	15	16	15	15	15	15	16	15	14
EASTERN EUROPE (P)	0	11	11	12	13	14	12	0	0	0	0	0	0	12	13	14	15	15	15	15	14	0	0	0
MEDITERRANEAN	13	13	0	6	6	13	11	0	0	0	0	0	0	0	15	16	16	17	18	18	18	16	15	14
MIDDLE EAST (P)	0	12	14	16	16	15	0	0	0	0	0	0	0	0	13	15	16	17	16	14	0	0	0	0
CENTRAL AFRICA	12	11	10	10	8	9	11	11	0	0	0	0	0	0	15	17	18	19	19	19	18	15	13	12
SOUTH AFRICA	0	10	9	8	8	7	11	11	0	0	0	0	0	0	15	17	18	18	16	14	0	0	0	0
SOUTH EAST ASIA (P)	18	16	17	17	17	16	15	0	0	0	0	10	10	10	11	13	13	13	13	13	0	0	0	16
FAR EAST	16	15	15	15	16	15	14	12	10	9	9	9	9	10	10	12	12	11	11	12	13	15	16	16
AUSTRALIA	19	20	20	20	20	17	15	14	13	12	12	12	11	11	11	12	12	0	0	0	0	18	20	19
TO/FROM US MIDWEST																								
SOUTH AMERICA	16	15	14	14	12	11	11	10	10	9	8	9	11	13	15	16	17	18	18	18	17	18	17	18
WESTERN EUROPE	13	11	11	10	10	10	10	9	9	0	0	11	13	15	16	16	17	16	16	16	16	17	17	16
EASTERN EUROPE	9	10	10	11	13	10	0	0	0	0	0	0	12	13	14	15	15	15	15	15	14	13	11	0
MEDITERRANEAN	13	12	12	12	12	11	10	0	0	0	0	0	13	15	16	16	17	17	17	17	17	16	15	13
MIDDLE EAST (P)	12	12	13	15	14	0	0	0	0	0	0	0	0	14	16	17	18	18	18	15	13	0	0	12
CENTRAL AFRICA	12	11	10	10	8	8	11	10	0	0	0	0	0	15	17	18	19	19	19	19	18	15	13	12
SOUTH AFRICA	10	10	9	8	8	7	11	11	0	0	0	0	0	15	17	18	19	18	16	14	0	0	0	0
SOUTH EAST ASIA (P)	16	16	16	16	15	14	0	0	0	0	0	9	10	12	14	14	13	0	0	0	0	0	0	15
FAR EAST	16	16	16	16	16	14	12	10	9	9	9	9	10	11	12	12	12	12	12	12	14	15	16	16
AUSTRALIA	18	18	19	19	17	15	13	12	12	12	12	11	11	11	12	12	0	0	0	0	0	18	19	18
TO/FROM US EAST COAST																								
SOUTH AMERICA	14	13	12	11	10	10	10	9	9	8	7	9	12	13	15	16	16	17	16	16	16	16	16	16
WESTERN EUROPE	12	10	9	9	9	9	9	9	8	0	11	12	14	16	16	17	16	16	15	15	16	15	15	14
EASTERN EUROPE	10	10	10	11	9	9	0	0	0	0	11	12	14	15	15	15	15	16	16	17	15	13	11	10
MEDITERRANEAN	12	11	11	11	11	10	10	0	0	0	12	13	14	15	16	16	16	16	16	16	16	14	13	12
MIDDLE EAST (P)	12	12	13	12	0	0	0	0	0	0	0	14	15	16	17	17	18	18	17	16	14	13	12	12
CENTRAL AFRICA	12	11	11	10	9	9	11	11	0	0	13	15	16	17	18	18	19	19	19	19	18	16	14	13
SOUTH AFRICA	10	10	9	8	8	7	11	11	0	0	0	14	16	17	18	19	19	18	16	14	13	12	12	11
SOUTH EAST ASIA (P)	16	16	15	0	0	0	0	0	0	0	0	12	14	16	17	14	13	0	0	0	13	0	12	14
FAR EAST	16	16	16	15	13	0	0	0	0	10	10	11	13	14	12	0	0	0	0	13	14	16	16	16
AUSTRALIA	18	18	17	16	14	12	11	11	11	11	10	10	12	12	12	0	0	0	0	0	0	18	17	17

Near Vertical Incidence Skywave (also called "district or shower" propagation mode



SKIP AREY, N2EI
tjarey@mosquito.com

Looking for Radios in all the Wrong Places

Well, here we are in the middle of summer. I guess it's about time I give my usual pep talk about hamfests, huh? Wrong, Bunkey! Not this year anyway.

This radio shopping season I'm going to clue you in on a bunch of neat places to look for radio equipment that you might not normally think of. Not all of the great radio hobby finds are at the nearest amateur radio hamfest. True, these are good places to start, but remember, the folks at these gatherings also have an intense interest in the radio hobby. There are bargains, to be sure, but some prices will be at a premium because the folks at hamfests know what they have and usually know what it's really worth. Outside of the hamfest circuit, a piece of radio gear may just go for well below what knowledgeable hobbyists would charge.

As most of you folks know, my shack is essentially populated with used gear. I'm a cheapskate by nature and prefer finding those second-hand bargains. Looking over my equipment shelves I realize that a good percentage of my gear comes from nontraditional sources. Let's take a look at some of the places where you may find radios and your fellow hobbyists won't be in such heavy competition with you.

If you're really lucky you may stumble across Uncle Barney's old Zenith Transoceanic. These are highly collectable at this time and do tend to show up in the darndest places because folks bought them and just sort of kept them around.

Check the attic

When I say check the attic, I don't just mean yours, but when possible, those of your neighbors, friends, relatives, etc. This is an especially good resource if you're into older and antique radio. If you have one of those relatives who has kept everything in the attic, you'll probably find an old radio or two. Maybe Aunt Thelma's son cousin Johnny got a shortwave receiver for Christmas back in 1960 so he could get a merit badge in Boy Scouts. Johnny lost interest in the rig ten minutes after his troop leader pinned on the new patch, but Aunt Thelma couldn't see throwing away the radio so up in the attic it went.

Talk her into a look around upstairs and you may just run across a classic Hallicrafters S-107 or a National NC-60 — maybe even a fine old Heathkit GC-1A "Mohican." None of these rigs are particularly rare or valuable, but they do represent a particular era of the shortwave hobby that I've always enjoyed.

If you're really lucky you may stumble across Uncle Barney's old Zenith Transoceanic. These are highly collectable at this time and do tend to show up in the darndest places because folks bought them and just sort of kept them around. You never know till you look, Compadre!

Newspapers

Did I ever tell you about my personal best radio find? A classic Collins R-390A/URR in perfect condition. This rig didn't appear at a hamfest or in the back pages of a radio magazine as one might expect of such a venerable receiver. Nope, I found this beauty in the pages of my local neighborhood weekly classified newspaper. You know, those little papers they throw on your lawn every week that you never bother to pick up and they become water soaked and you run over them with the lawn mower?

This most excellent receiver which has remained my primary DX machine for some fifteen years now was found for $150 and was *only* advertised in that little local weekly paper. As it turned out I was also the only person to answer the ad! The seller was not a radio hobbyist but a professional journalist who used the rig to track world events for his work. Now get this: he didn't think there was much of a market for an old receiver like this so he figured he'd just put it in the local paper. This is a deal that folks dream about and all it took was the time to pick that silly little paper off the lawn and read it. That, a phone call and a hundred and fifty bucks!

Now I know what some of you want to ask. Why was he selling this nifty rig? Well, as it turns out he had replaced it with a Racal RA6778A, a relatively rare but exceptional receiver. I made sure to leave him my card in case the day ever came that he wanted to "upgrade" once again.

You will soon see that a recurring theme in the article will be to *Read The Paper*! Local and regional classifieds can turn up wonders and as I have pointed out, even those little papers on our lawns can turn up treasures.

Amateur Radio

Of course I've been bugging you to get your ham license for years now. Let me give you yet another incentive. Conversations on the ham bands can turn up some incredible equipment. You think the above mentioned deal on the Collins R-390A was great? Wait till I tell you how I snagged my second one.

It was the night before the night before Christmas (December 23, 1988). I was doing some stuff around the shack and I had my two-meter rig tuned to the local repeater which ran a "swap net" once a week. A ham a few towns over put an R-390A out on the net for sale. Some of my ham friends say to this day that nobody ever keyed a microphone as fast as I did that night. I asked that fateful question "How Much?" figuring half heartedly that my

funds had dwindled during the holiday season and the rig would be well out of my reach. The guy came back "Fifty bucks." Once again I keyed the mike with lightning speed and told the gentleman "SOLD, I'll be right over!"

Being close to the holiday, the net had light attendance so nobody improved upon my offer. I "think" I told my wife where I was going that night. I don't remember. I do remember driving through the snow and holiday shopping traffic to find my second R-390A/URR. This one was a Motorola produced unit, a bit rough around the edges, but working fine. Sitting next to it on the bench in the garage was a classic Heathkit DX-100 transmitter. The seller told me he'd throw it in for another ten dollars just to get it out of his garage. Well, sixty bucks exchanged hands and the back of my car was significantly weighed down by these two radio hobby behemoths. Both still grace my shack and remain in perfect working order.

Since that time, more than one deal has been struck due to a casual conversation commuting to and from work on my local repeaters. Give ham radio a try and you may find equally great bargains yourself.

Auctions

Once again, this is a process that begins by reading the newspaper. You will find auctions of items from local households all the way up to major corporate liquidations. Any of these events can turn up a radio or two. Household level auctions are often held to remove the essential contents of a house due to a death or retirement. Remember that radio in Aunt Thelma's attic: In this case they have just emptied out the attic for you. Corporate level auctions may not turn up radios, but they are a great source of desks, chairs, and file cabinets to populate a shack. You can also find interesting deals on computer equipment at corporate auctions.

At an auction you usually register and are given a number. You then have the opportunity to bid on individual items or "lots." A lot might contain several things you have no particular use for but that radio you want is in the group. Keep an eye on the other folks at the auction. You may share an interest in the same lot for different reasons. In such a case you can work together and split the costs.

One word of warning: Don't get too caught up in the bidding. Be ready to let something go if the price goes beyond reason. Before the bidding starts, fix a price in your mind you will not go over and *stick to it*! There will be other auctions and other deals.

If you live near a military base, check out the base public auction schedule. Uncle Sam unloads a lot of great equipment for scrap metal prices. At military auctions everything tends to be sold in lots, often made up of totally unrelated items. I have a friend who is also an R-390A collector. He went to an auction at a nearby Air Force base and bought a lot that consisted of five R-390A's and fifty truck tires and rims for $250.

He was putting the rigs in his car and starting to worry that he would have to pay somebody to haul the tires and wheels away for him when he was approached by a guy who offered him $100 for the stuff he didn't want. The guy told him he was only willing to bid $100 for the tires and wheels and he would have just thrown the receivers away as he had no use for them.

Out of the five rigs three worked right off and the other two serve as parts to keep those three running. You may not find many R-390A's these days but some of those Racal's I mentioned earlier are starting to show up at base auctions so it's worth the trip.

Estate Sales

You can usually find these listed in the newspaper as well. This is a liquidation of assets of a deceased person. I know of an estate sale that included a complete high end ham station that was sold at a very reasonable price. It seems the recently departed gentleman had upgraded his shack not too long before his death. My understanding is the estate sale agent let the whole package (worth about three grand) for $500. Once again, it is possible to turn up amazing radio deals in unusual locations.

Flea Markets, Garage Sales, and Swap Meets

... Not the amateur radio kind, but the traditional kind. My long-suffering spouse loves to hit the local garage sale circuit most Saturdays. I usually go along as her resident beast of burden. Occasionally I turn up some interesting items. Recently I have begun a very nice collection of pocket transistor radios from the fifties and sixties all purchased for mere pennies at garage sales and flea markets. I have also turned up a few scanners and a GE SuperRadio II on recent romps.

Dumpster Diving

I have a friend who fixes up old computers and gets them in the hands of folks who can't afford such things. His nearly exclusive resource has been to keep an eye on the dumpsters behind some big companies. Dumpster diving can be a risky business and in many areas it constitutes trespassing, so I would advise against it. However, if you happen to notice something being thrown out, or if you see some interesting pieces sitting out at someone's home on trash day, it never hurts to ask for it, now does it?

Think you can't find anything good in the trash? I have a 1950 Zenith radio that I'm restoring now that came out of a trash can I passed on the way to work.

Read the newspaper. Keep your eyes open. Reasonably priced radios are everywhere. Have fun!

Kevin Carey, WB2QMY
kevinc@mdsroc.com

Who Lurks in the Basement?

For many newcomers, the longwave band is a mix of mysterious beeps, buzzes, and other unidentified sounds. With an understanding of "who's who," these mystery signals can be unraveled and you can get greater enjoyment from your monitoring efforts.

This month we'll take a quick tour of the longwave band, making stops along the way to discuss the major players you're likely to encounter. Are you ready? Let's begin at the top end of the band: 518 kHz to be exact.

518 kHz is the home of NAVTEX, a teleprinter service offered by the U.S., Canada, and many other countries worldwide. These stations broadcast marine safety and navigation information, as well as weather notices and reports of missing vessels. The messages contain a preamble code that identifies the type of information and the navigation area to which it applies.

If you have a stable receiver with a BFO, a PC, and an RTTY demodulator, you can receive NAVTEX messages. Set your demodulator to "Amtor Mode B" or "Sitor Mode B" for proper reception.

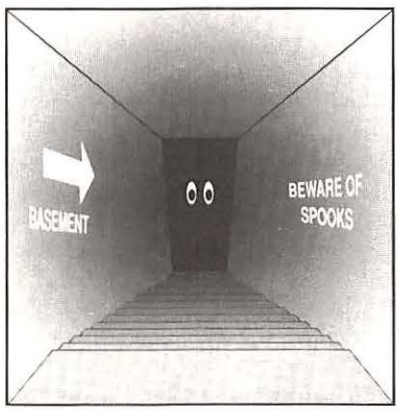
Our next stop is at **500 kHz**. Long known as the International Distress and Calling channel, the future of this CW frequency is in some doubt. At one time, international agreements required many sea-going vessels to carry equipment for this frequency, so there is still a large user base out there. This has contributed to some continued use of 500 kHz despite its declining popularity and the overall phase-out of CW.

You'll find more routine maritime CW traffic from **430-500 kHz**. Like the 500 kHz Distress & Calling frequency, use of this band is rapidly declining in favor of satellite and HF/VHF communications. The old adage of "catch 'em while you can" applies here.

From **430 down to 190 kHz** you will hear the flagship stations of the longwave band — navigation beacons. In the days before GPS, there were many more beacons operating on the longwaves. Now they are used mainly as backups to more sophisticated navaids.

These unmanned, low power (usually 25-50 watt) stations transmit a continuous Morse ID, typically two or three characters long, for use by aviators and mariners equipped with radio direction finding (RDF) equipment.

Complete data for North American beacons (including QSLing information) can be obtained from the *Aero/Marine Beacon Guide*. For ordering information on the Guide, write to: Mr. Ken Stryker, 2856-G West Touhy Ave., Chicago, IL 60645.



The band from **280 down to 150 kHz** is used for longwave broadcast in ITU Region 1 (includes Europe and Africa). These broadcasts are meant for regional consumption, not worldwide coverage as with SW stations. For this reason, it can make some very interesting listening.

These signals occasionally reach North America when conditions are right. Try listening when a path of darkness exists between you and the foreign station (from your local dusk to about 6 hours before sunrise). U.S. listeners on the East Coast have the best chance of hearing these stations.

A sliver of spectrum from **160 to 190 kHz** is home to a hardy group of experimenters known as Lowfers (short for Low Frequency Experimental Radio Stations). FCC regulations allow for the use of an unlicensed transmitter in this frequency range as long as the following conditions are met:

1) Transmitter input power may not exceed 1 watt

2) Antenna length (including antenna feedline and ground lead) must not exceed 15 Meters (50 feet).

3) All out-of-band emissions must be at least 20 dB below the strength of the fundamental carrier.

The best source for information on lowfer activity is *The Lowdown*, the journal of the Longwave Club of America (LWCA). Information about LWCA membership can be obtained by writing the club headquarters at: 45 Wildflower Rd., Levittown, PA 19057.

By the way, a similar experimenter's band exists for UK amateurs at 73 kHz. For more info, check out the 73 kHz homepage. At this writing, the address for this page is **http://www.stonix.demon.co.uk/73kHz/**.

The raspy bursts of noise from **150 to 175 kHz** come from the Air Force Groundwave Emergency Network (GWEN). These packet-like data stations are scattered throughout the U.S. and are intended to provide high level communications during a nuclear war. Originally the system was to be much larger, and even include some rapid deployment trailered stations, but funding cuts in the 1980s put an end to further development.

Military RTTY stations dominate the range from **20 kHz to 150 kHz**. They've chosen this frequency range for its propagation stability and ability to penetrate water (useful for one-way submarine communications). One exception to the military RTTY is WWVB at 60 kHz, the longwave sister station to well known WWV.

From **DC to about 20 kHz** is generally considered the territory of "Natural Radio." The only man-made signals you're likely to find are the beeps of the worldwide OMEGA navigation service at 10-14 kHz. At one time, Omega was considered a state-of-the-art navigation tool, but it is now used mainly as a backup to GPS.

But back to Natural Radio. These are signals from the Earth itself and its atmosphere. The big four natural radio sounds are Sferics, Whistlers, Tweeks and Chorus. They are caused by the interaction of lightning, the Earth's magnetic field, and charged particles from the sun (solar wind). My December '96 column explored many of these sounds in detail. You may also want to search the Internet for Natural VLF Radio topics. There are many sites of interest to today's experimenter.

End Notes

Chasing beacons has been the traditional mainstay of longwave hobbyists, but with the declining numbers of these stations, the focus of the hobby may well shift to include experimental activities such as Natural Radio and the license-free lowfer band. Whatever the winds of change may bring, *Below 500 kHz* will strive to bring you the best in longwave monitoring times.

Note on advertisement below: *As of 4/26/94 it became unlawful to market cellular-capable receivers in the US. Atlantic Ham Radio assures us that it will give a full refund and hold customers harmless from shipping expenses if a purchased unit is returned to the vendor by US Customs.*

Doug Smith, W9WI
72777.3143@compuserve.com

Digital News

On April 3, the FCC adopted final rules for digital television. These rules will completely change the face of television in the USA. The new FCC rules have assigned a specific second channel to each existing TV station for its digital service.

Most commercial stations have five years to begin digital (DTV) operations. (Non-commercial stations have six years; some commercial stations in larger cities may have as little as two years.) All analog operations will shut down in the year 2006. In the interim, stations may operate digital and analog transmitters at the same time.

The new table tries to avoid use of channels 60-69. These channels will join channels 70-83 in becoming land-mobile spectrum. The relatively few TV stations currently operating in channels 60-69 will be assigned lower channels for DTV, and will be protected from land-mobile interference until their analog transmitters are shut down. In other parts of the country, where these channels are not used by TV stations, they'll be promptly reassigned. The commission is likely to reserve four of these channels for public-safety services, and auction the other six for commercial use.

Once analog TV ceases in 2006, the channels currently in use for analog service will become available. The FCC expects to use some of these assignments to further reduce the spectrum used by TV. Either channels 2-6 and 52-59, or channels 47-59, will be removed from TV service and auctioned for commercial use.

Why digital?

Obviously, this DTV system will cost a lot of people a lot of money. Every TV station in the country will need another transmitter and new studio equipment. Most stations will need another transmitting antenna, and many will have to build a new tower. Consumers will have to buy new TVs and VCRs. Why bother?

The best reason is vastly improved picture quality. The current TV system is analog. Your local TV station transmits a radio signal whose strength varies according to ("is analogous to") the brightness of the scene at any given instant. This signal can vary from very weak (when a very bright scene is being transmitted) to fairly strong (when a black picture is being transmitted), and anywhere in between.

The problem with this is noise. Any noise or undesired signal — whether it comes from lightning strikes, sparking motors, poorly-filtered CB transmitters, or distant TV stations skipping in — mixes with the desired TV signal. It causes the signal to seem stronger or weaker than it really is, and you see it on your screen.

In April, I wrote about CBC Radio and TV in Canada's vast north. Here's a picture of the CBC studios in Whitehorse, Yukon, used by CFWH-570 and CFWH-TV channel 6.

Digital TV is a very different system. Instead of transmitting a signal of varying strength, the station transmits a series of pulses. These pulses represent numbers, or "digits." The numbers transmitted could represent just about anything. For DTV, the numbers represent the brightness of the picture at a given instant. Each pulse may (or may not) happen at a specific pre-determined time. The pulse is either present or it isn't.

Noise may make one of the pulses appear stronger or weaker than it really is, but the digital TV set must only decide whether a pulse is actually present. The chances it'll make a correct decision are very good. Even if it doesn't, through the use of special codes the TV set can determine whether the number received was correct. In some cases, it can even determine what an incorrect number was supposed to be. As long as the DTV signal is strong and interference-free enough for the TV set to determine whether pulses are present, you'll get a perfect TV picture.

Compression is another reason for DTV. Through compression, we can reduce the "number of numbers" necessary to transmit a picture of given quality. For a simple example, imagine you want to transmit a white screen. The number representing pure white is 255. Without compression, you transmit the number 255 for each distinct spot on the screen: this could be 400,000 numbers to transmit. With compression, you transmit the number 255 once (to say you want a white spot), then the number 400,000. (to say how many white spots you want) This is an extreme example, but it does give an idea of how compression works.

By reducing the "number of numbers" transmitted, you can transmit more than one picture in a given TV channel. Or, you can transmit one picture with much better detail. Or, you can transmit one standard picture and a series of numbers representing something other than a TV picture. Your local TV station could easily become four or more stations. Or, it could become two TV stations and a digital music service. There are many possibilities.

What does DTV mean to me?

Whether you're a DXer or not, remember this: *all currently available TVs will become obsolete in the year 2006*! Adapters will be available, so you won't actually have to throw out all your TVs. But I would strongly recommend against buying an expensive TV set until the digital receivers become available in two years or so. If you must buy a TV before then, buy the least expensive set you can get away with. Incidentally, this also applies to VCRs; don't buy a VCR until DTV VCRs come out.

If you are a DXer, don't panic. Contrary to

popular opinion in the DX community, it *will* be possible to DX digital transmissions. That said, TV DX in the future will certainly be a different pursuit. Co-channel interference will be a thing of the past. A DX signal will either be perfect snow-free copy, or non-existent. You won't be staring at the screen trying to make out that noise-covered call letter display, but you also won't be seeing the "CKND" call letters floating through the picture on your local channel 2 station anymore. I haven't yet had time to read the entire DTV standard (it's several hundred pages..) but I'm pretty sure a continuous ID will be part of the data transmitted. You won't face the frustration of having a station identify with "This is Channel 6" and illegibly tiny call letters.

As you swelter in the July heat, look at the snowbanks in this picture and think cool thoughts. This is the studio facility of CHON-FM (98.1 MHz), also in Whitehorse. Thanks to Ronald Tull VY1RT for these photos!

Digital radio is also coming soon

Development work is continuing for a digital radio system for earth-based stations. You've read in this column about plans for digital broadcasting in Canada; a pioneer transmitter in Toronto should be on the air next month. Digital radio now covers almost half of the U.K., using frequencies near 219 MHz.

Now, the FCC has issued two construction permits for satellite-based digital radio broadcasting to the US. An auction was held on April 1 (no fooling..) to decide who would receive the two available licenses. Each license will operate in S-band spectrum between 2320 and 2345MHz and will provide several dozen channels of programming in full digital CD quality. I would expect it to take 2-3 years for these systems to begin broadcasting.

Bits and Pieces

The new 17th Edition of Bruce Elving's *FM Atlas* is now available. This is the standard reference for the FM DXer — and an invaluable tool for the traveler. Get your copy from Grove Enterprises; see the pullout Buyer's Guide for information and an order blank. Incidentally, if you prefer to DX AM, the *NRC AM Radio Log* is also still available for $22.95 from NRC Publications, Box 164, Mannsville NY 13661.

What's up in digital broadcasting in your area? Is anything happening in the analog domain? Let us know about it! Write American Banescan, P.O. Box 98, Brasstown NC 28901, or via the Internet to 72777.3143 @compuserve.com. Good DX!

ASHEVILLE/GREENVILLE/SPARTANBURG DTV ALLOTMENTS

The complete DTV channel table is too large to print here. If you'd like to see the complete table, look at **www.fcc.gov** on the Internet. Here's a sample: the allotments for the North Carolina/South Carolina area.

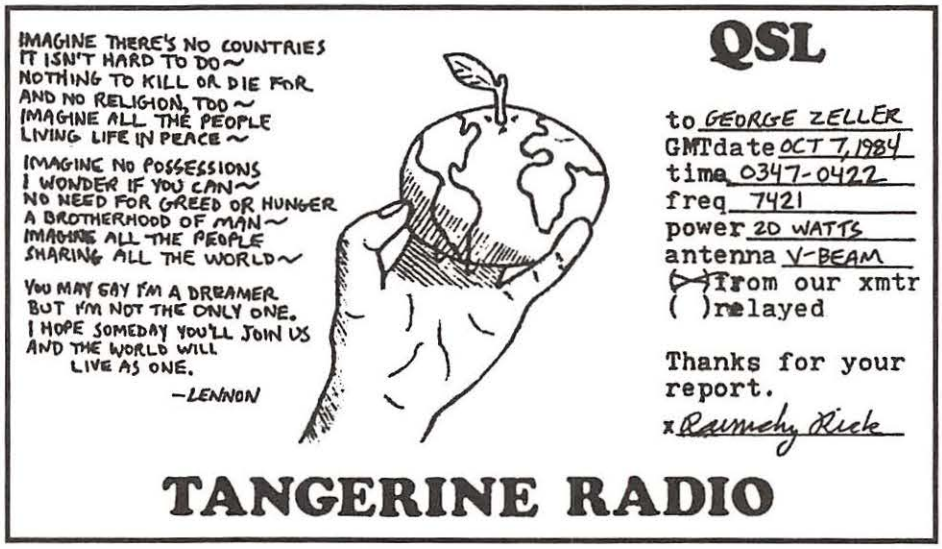
Call letters:	Old analog channel:	New DTV channel:
WYFF (NBC)	4	59
WSPA (CBS)	7	53
WLOS (ABC)	13	56
WGGS (independent)	16	52
WHNS (Fox)	21	57
WNTV (PBS)	29	9
WUNF (PBS)	33	25
WFBC (independent)	40	14
WRET (PBS)	49	43
WASV (UPN)	62	45

George Zeller
George.Zeller@acclink.com

Another Superpowered Pirate: Radio Metallica

Hot on the heels of last Christmas Eve's 15,000 watt pirate transmission from **WJDI**, a new powerhouse has appeared in the North American pirate bands. **Radio Metallica Worldwide** materialized in mid-May with an announced 10,000 watts on slightly variable frequencies around 6955 kHz. Dr. Tornado, station host, uses the slogan "the most powerful pirate station in the nation." Early shows featured rock music and test announcements.

The solid signal and good AM audio quality from this new operation make it an easy log in North America when it is broadcasting. Dr. Tornado said that he would provide QSL information "in two weeks," so we hope to have it next month.



Anarchist Radio returns to shortwave.

Illinois Micropirates Still On

Two of the best known longtime political micropirates, Napoleon Williams' **Black Liberation Radio** and Mbanna Kantako's **Human Rights Radio**, remain on the air despite continued controversy in 1997. The *Chicago Tribune* reported that despite a January 9 FCC bust that included confiscation of all his equipment, Williams remains on the air from Decatur, Illinois, on 99.7 MHz. A new and more powerful transmitter was donated to his station by other micropirate supporters after the bust. Williams' criticisms of local political officials have resulted in multiple busts and a $17,500 fine, which he has ignored. Thanks go to *MT* reader Ed Schwartz, who forwarded copies of newspaper accounts covering these incidents.

Last month we mentioned that Mbanno Kantako's station had moved, given the forthcoming demolition of the John Hay housing project. Mike Townsend of Springfield, Illinois, a longtime supporter of the station, sends a new address for reports to them: Human Rights Radio, c/o Mbanna Kantako, 719 1/2 North Sixth Street, Springfield, IL 62702. The station, still active on frequencies around 107.5 MHz, welcomes calls at (217) 527-1617.

Radio Butembo

The fast-moving revolution in Zaire has created a variety of clandestine broadcasting stations. The latest one, Radio Butembo, was discovered April 25 by BBC Monitoring on 7060 kHz. Broadcasts have been heard in Swahili and the Kindande language around 1600 UTC, which unfortunately makes it inaudible in North America at high noon on 41 meters. Summer propagation conditions will make Zaire clandestine hunting difficult during the current crisis.

Republic of Texas

The May standoff between Republic of Texas officials and Texas law enforcement personnel in Fort Davis, Texas, made the national news for several days. You may have forgotten that this group had a pirate radio connection. Two years ago the Republic announced that it had plans to construct a 50 kW medium wave station, presumably to operate from western Texas.

As was confirmed during the recent confrontation, the Republic does not accept the validity of Texas' entry to the United States in the mid 1800's, so FCC jurisdiction was irrelevant to them. Repeated inquiries about the proposed station by *Monitoring Times* to Republic officials generated no response during the last year, and no superpowered medium wave pirate has materialized. We appreciate several local press accounts of the Fort Davis incident that were sent in by regular *MT* reporter Gigi Lytle of Lubbock, Texas.

As reported on the Voice of America "Communications World," **WWCR's** "The Intelligence Report" program has been carrying support for Republic of Texas political positions. This show is easily heard on 5070 kHz at 0000 UTC.

Carling's Pirate Links

A little known collection of internet web site links with pirate radio content is found on the home page of Brian Carling. Try **http://www.mnsinc.com/bry/** and head for the links section.

Flood Misses Axelrod

We're very happy to report that *MT* reporter Shawn Axelrod of Winnipeg, Manitoba, says that the May floods in his city did not reach his home, although there was considerable damage in that province and in North Dakota. Shawn says that his DX location temporarily was renamed Valhalla Beach. He appreciates the many messages of concern that he received from his friends in our hobby.

What We Are Hearing

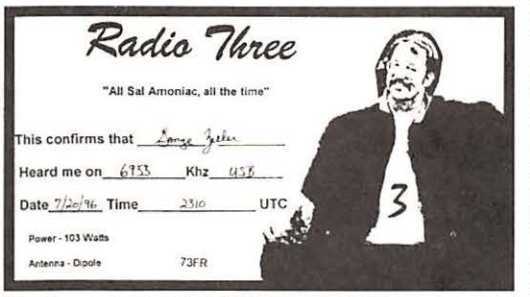
Your pirate loggings are always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address at the top of the column. All frequencies are in kHz, with times in UTC.

North American pirate stations listed here use the following addresses: PO Box 1, Belfast,

NY 14711; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 28413, Providence, RI 02908; PO Box 146, Stoneham, MA 02180; and PO Box 11522, Huntsville, Alabama 35814. For return postage, enclose three 32¢ stamps in the envelope to USA addresses. $2 US or two International Reply Coupons go to foreign maildrops. The FRN web site at **http://www.frn.net/** works for Stereo Sound Radio.

Note that with the return of summer propagation, the 39 meter pirate band is staying open much later than it did during the winter. Pirate reception has improved during evening hours as late as 0500 UTC.

Anteater Radio- 6955 at 2300. Peter Worth discusses pirate radio while spinning rock tunes. Addr: Belfast. (Michael Prindle, New Suffolk, NY)
Cherokee Radio- 6955 at 0200. Also identifying as Native American Broadcasting, this new station has primarily been a rock music operation so far. Addr: None; says will QSL logs in *The ACE*. (Lee Silvi, Mentor, OH; Rich and Talea Jurrens, Katy, TX; George Zeller, Cleveland, OH)
FBI Radio- 6955 at 0230. The staff at Females Broadcasting Interference has been adding commentary on pirates and current events to their normal rock music. Addr: Huntsville. (Randy Ruger, North Hollywood, CA; Axelrod; Jurrens; Prindle; Silvi)
Free Radio Maker- 6955 at 0030. Neil heard a relay of this Europirate, which played a variety of rock music. But, we have little information on it. Any help, readers? Addr: Probably in Holland? (Neil Wolfish, Toronto, Ontario)
Honky Tonk Radio- 6955 at 1845. Although they say that they are "not the original," their country music has recently peppered the pirate bands. Addr: None. (Silvi)
KOLD- 6955 at 0030. Aldo Batisti is the primary jazz format pirate station. A recent broadcast was billed as a Glenn Miller special. Addr: Stoneham. (Barry Williams, Enterprise, AL; Jurrens)
KRAP- 6955 at 0030. Fred Flintstone is the host on this new rock music station. Their transmitter puts out an unusually powerful AM signal, so they've been widely heard. Addr: None. (Kevin Nauta, Grand Rapids, MI; Jeff Ryan, Yardley, PA; Barry Williams, Enterprise, AL; Williams; Zeller)
Mystery Radio- 6955 at 0330. Their rock music playlist always has a distinctive new age sound to it, although mainstream bands like Pink Floyd are sometimes heard. Addr: Stoneham. (William Hassig, Mt. Prospect, IL; Jurrens; Williams)
Radio Azteca- 6955 at 1700. Bram Stoker has produced more than two dozen funny parodies of DXers and DXing. You're liable to hear yourself as the butt of jokes if you write in! Addr: Belfast and Blue Ridge Summit. (Williams)
Radio DC- 6955 at 0030. Here's a station with a consistent format. They always transmit in CW Morse code, with a slogan of "Don't Vote Republican." Obviously, Newt Gingrich is not operating this station. Addr: None, sometimes verifies logs in *The ACE*. (Greg Anderson, Mt. Vernon, VA)
Radio Eclipse- 6956 at 0345. This rock music operation was relatively inactive for a few years, but in 1997 they have emerged with multiple pirate transmissions. Addr: None; announces that they sometimes verify loggings in *The ACE*. (Axelrod; Jurrens; Nauta; Ruger)
Radio Eurogeek- 6955 at 0445. Still famous for their transmission just before St. Helena's once a year broadcast in 1996, this parody of Europirates is highly amusing. Addr: Providence. (Ruger)
Radio Garbanzo- 6955 at 0400. Fearless Fred's humor tends toward the crude, but much of his original material is just plain funny. Rumors from Washington indicate that his campaign to become an FCC Commissioner is not going well. Addr: Belfast. (Hassig; Jurrens; Ryan; Williams)
Radio KAOS- 6955 at 0030. Joe Mama stunned many of his listeners with an elaborately produced "farewell broadcast." But, the station operator is still around the pirate scene, and he could resurface in the future. Addr: Belfast. (Larry Michalski, West Seneca, NY; Ray Carmen, Canton, OH; Hassig; Jurrens; Nauta; Ruger; Silvi)
Radio Metallica Worldwide- 6961 at 0115. Many have heard this powerhouse; see the story above. Addr: None yet. (Kevin Graniero, Madison, WI; Nauta; Ryan; Timothy Woods)
Radio Tellus- 6955 at 0415. The playlist on this regular occupant of the pirate bands is usually made up of elaborate rock music compositions. Despite their usual upper sideband mode, the audio fidelity on their music is pretty good. Addr: Providence. (Hassig; Jurrens; Nauta; Ruger; Silvi; Williams)
Radio Three- 6955 at 0000. After hundreds of days of delay, many DXers were very happy to receive the QSL that we picture this month from Sal Amoniac. His syrupy rock oldies format remains unchanged. Addr: None; now verifies logs in *The ACE*. (Wolfish; direct from the station)
Radio Two- 6055 at 2000. Station announcer Yabba Dabba Do has an extensive collection of rock oldies music, which he plays and discusses. Addr: Providence. (Silvi)
Radio USA- 6955 at 1800. Despite a bust by the FCC a few years ago, Mr. Blue Sky and Joe King have been continuously active for 14 years with punk rock music and original comedy. Addr: Belfast. (Bob Thomas, Bridgeport, CT)
Solid Rock Radio- 6955 at 0100. Dr. Love's pirate station has been with us since 1993. Musical styles vary on their shows, although soul and rap dominate. Addr: Belfast. (Williams)
Southern Music Radio- 6955 at 1930. This veteran New Zealand pirate is usually a difficult catch, usually via the transmitter at **KIWI,** but they sometimes find a North American relay for their New Zealand and Australian music programs. Addr: Belfast. (Nauta)
Stereo Sound Radio- 6955 at 0000. Rock music is their central focus. On some shows they have used a **KSSR** call letter identification. Addr: None; still verifies via the Free Radio Network internet web site. (Martin Field, Hillsdale, MI; Jurrens; Prindle; Williams)
Tangerine Radio- 6955 at 2045. Raunchy Rick's anarchist station was extremely active back in 1984. Its occasional return to the airwaves brings back memories for veteran pirate DXers. Addr: Belfast. (Hassig)
Voice of Bizarro World- (Jurrens; Williams) Addr: None; verifies logs in *The ACE*. Station his on backwards is everything. Book comic Superman the by inspired was Xhem operator station. 6955 at 0300. (Jurrens; Williams)
Voice of the Daleks- 6955 at 0100. The Dalek commander recently suffered a setback when his spaceship was destroyed, so the future of this station is unknown. It could reappear; the explosion show was repeated several times. Addr: Belfast. (Silvi; Williams)
VOXXX- 6955 at 0200. Given their adult movie audio tracks, the call letters of this pirate are appropriate. Addr: None; says will verify logs in *The ACE*. (Jeffrey Nicklaw, Asheville, NC)
WARR- 6955 at 0015. Captain Nobeard's rock music and marijuana advocacy shows are widely heard and well produced, but he's generated controversy by failing to contact the maildrop that he announces for correspondence. Addr: Belfast not working. (Axelrod; Prindle; Silvi; Williams)
WEED- 6955 at 0430. Although Johnny Smoke's format is quite similar to WARR, the slick production values on his station have made him a popular pirate. Addr: Huntsville. (Jurrens)
WHWARR- 6955 at 0130. Captain Lowbeard uses a "We Hate WARR" slogan on this parody station, which says that it won't announce an invalid maildrop. It says it won't QSL, either. Addr: None. (Jurrens)
WLIS- 6955 at 2300. During an interview with *MT* at the ODXA Convention in Toronto, Ian McFarland (of Radio Canada International and Radio Japan fame) said that Jack Boggan had taken a new photo of Ian at the Winter SWL Festival, so that this interval signal station could update its series of dozens of different Ian QSL's. Addr: Blue Ridge Summit. (Joel Gosse, St. Paul, MN; Jurrens; Silvi; Williams)
WMPR- 6955 at 2245. This one's techno-pop dance music remains somewhat mysterious, given their synthesized voice identifications and their relative lack of communication with DXers. Stephen heard them on a local Monday night. Addr: None. (Stephen Lord, Cambridge, MA; Jurrens; Nauta; Prindle; Williams)
WPN- 6955 at 2000. Captain Squirtlong is working more comedy material into his shows, which makes sense at the World Parody Network. Addr: Huntsville. (Gosse; Jurrens; Williams)
WPRS- 6955 at 1400. Willie B. Quiet isn't on every night like he was last August, but his rock and comedy format still appears from time to time. Addr: Providence. (Silvi)
WREC- 6955 at 0200. P. J. Sparx is famous for his vast collection of novelty songs performed to the tune of rock oldies music. Lately he has been transmitting lengthy live discussions with in-studio guests, which propagated to Europe with only 20 watts! Addr: Belfast. (Ranier Brandt, Germany; Axelrod; Field; Hassig; Jurrens; Nauta; Ruger; Silvi; Williams; Roger Wiseman)



The long-awaited Radio Three QSL.

Ike Kerschner, N3IK

Looking Forward into Ham Radio

A new amateur satellite was launched in early March; designated RS-16, it operates in a similar manner to the earlier RS-10 and RS-15 birds that so many of us have enjoyed using.

RS-16 has an average orbital altitude of 276 miles and produces a footprint of about 2,000 miles on the earth.

At this point not all of the data on this satellite is available. Reports of hearing the beacon on 29.408 MHz indicate it is a mode A transponder (2 meters up: 10 meters down), as are all of the other RS birds. Additionally, 70 cm beacons are supposed to be operational on 435.504 and 435.548 MHz.

Expected uplink frequencies will be 145.915 to 145.548 MHz; downlink should be 29.415 to 29.448 MHz.

Orbital elements should be available by the time you read this: keep watch on your local bulletin board system or ARRL bulletin stations.

A New Ham Radio?

As we press forward into a new century, amateur radio is exhibiting changes few of us could have predicted 46 years ago when I first got into this hobby.

Space communications is but one of the new directions our hobby is taking. There is a special feeling one gets when communicating with another ham thousands of miles away via a satellite.

In the early 50's several articles about utilizing a orbiting satellite for communications were published, but few if any hams at the time considered the possibility of ham radio being included in this amazing concept. Besides, the idea of being able to communicate over intercontinental distances via VHF or UHF was generally considered ridiculous. Well, we know better now!

Seldom a month goes by that a magazine does not belabor the poor operating practices of some hams. Or complain about the old fogies crew on 75 or 20 meters. This always seems self-defeating to me! As we move into a new era in communications there are so many exciting things going on; there simply is not time to worry about the die-hards and hold-outs of the 50's and 60's who do not want to advance the hobby.

Generally my experience in ham radio has been that hams as a group are curious and like grabbing onto something new. To be sure, not everyone is able to comprehend many of the technical concepts involved with the new forms of communications. There are, however, many who do, and are willing to teach and lead others into the new arenas. That's why ham radio is such a great hobby!

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Phase III D

It's due to be launched in September of this year. If successful, this exciting new satellite will bring real satellite DX many hours every day to most parts of the world.

Phase 3D is the result of the efforts of more than a dozen AMSAT groups on five continents. It will be the most elaborate amateur satellite ever launched into orbit and will have something for everyone.

Phase 3 D carries many different transponders and will accommodate CW, SSB, and digital modes. A new feature on this bird is a set of TV cameras that will be used to view Earth, the planets, and other objects in space. Full details on how the average ham or SWL will be able to utilize the photos from space feature have not been detailed as yet. Software to view photos from Phase 3 D will be available from AMSAT.

For more information on Phase 3 D contact AMSAT North America, 1324 Fairgrounds Road, Xenia, OH 45385-5325. AMSAT is a not for profit organization which needs your help to keep amateur radio in the space communications business. If you are not a member, by all means join and help the effort.

3 D is in keeping with the adventurous/pioneering tradition of ham radio. Watch *MT* to learn more about how to be part of it!

Vanity Call Signs

If you have been following the vanity call sign program's ups and downs, be of good cheer. By the time you read this the program should be off and running. Basically a vanity call sign will cost $50.00 for a ten year term; not too bad if you really want a special call.

The original vanity call sign program was intended to get hams interested in obtaining the Extra class license. The FCC offered two letter calls to any Extra that wanted one. Of course the individual ham had to choose several calls in hopes of obtaining one he desired.

My call N3IK was a result of this program. Not too long after this program went into effect it ended due to abuses in the system.

Six Meters

Frequently I ask for input on six meter operation from my readers. By this time the 97 Sporadic E season should be well underway. Anyone with interesting activity reports please drop me a note.

Of special interest is SSTV activity on six meters. If you know of any such activity on six please let me know. SSTV nets on six meters are of special interest and I would like to have times and frequencies of such nets.

I would also like information on FM activity in your area. Of special interest is how active local 6 meter FM activity is and what or how it was encouraged in your area.

Call for Circuits

I receive quite a few requests for simple tube circuits. Transmitters, receivers, and accessories are all in demand. If you have any circuits to share, please drop me a note with a copy of your circuits. I'll try to assemble them into a loose leaf notebook format to send to those who are interested. Feel free to send any solid state circuits that you feel would be of interest as well.

Software Info

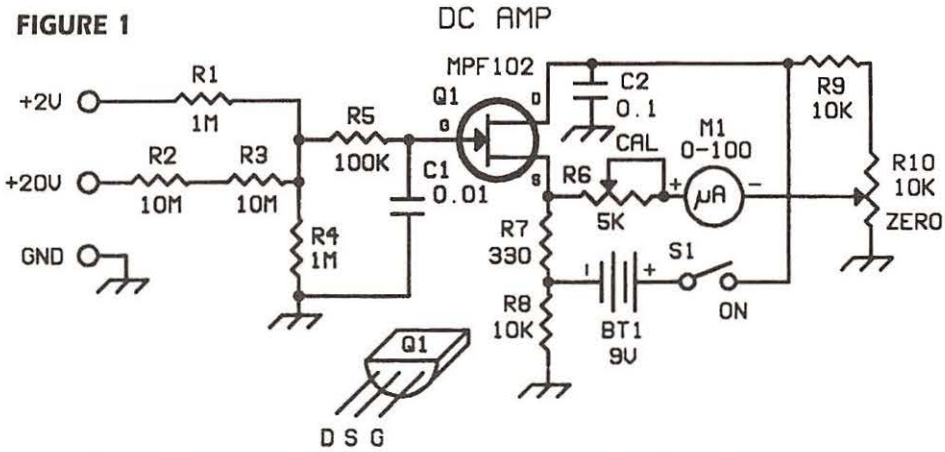
Several months ago, I offered to send a list of shareware to anyone sending me a large SASE. I sent out about 15 or so lists before the disk I had the information stored on was lost. I am in the process of rebuilding the disk, so those of you who have not received their list please bear with me. Chances are it won't be completed till Christmas.

Doug Demaw, W1FB

Build a Handy Battery Tester — A Quickie Weekend Project

Nothing can be more fun than to assemble a useful circuit that uses few parts and does not require an elaborate PC board. This month we will learn how to construct a simple DC voltmeter from ordinary parts. It will measure 2 volts (range 1) or 20 volts (range 2). A gadget of this type is useful for checking batteries and for trouble shooting circuits that have an operating voltage no greater than 20. I am including plans for an RF probe that can be used with this meter, or with any VTVM that has an input resistance of 10 megohms (standard). The parts are soldered directly to the foils on the PC board.

FIGURE 1



Schematic diagram of the simple DC voltmeter. Capacitors are disk ceramic. Fixed-value resistors are 1/4- or 1/2-watt carbon composition. BT1 is a 9-V transistor radio battery. R6 and R10 are small PC-mount carbon potentiometers. See text for data concerning M1. S1 is a SPST toggle switch.

The Circuit

Figure 1 shows the circuit for our mini voltmeter. Only one transistor is required. A single MPF102 or equivalent JFET does the entire job while serving as a DC amplifier. Two PC-mount potentiometers are used for calibration. R10 is adjusted for a zero meter reading when the test probes are not connected to a DC source. R6 is used to calibrate the meter from a known voltage source, such as a fresh 1.5-volt dry cell. The voltmeter accuracy is 10% or better if 5% resistors are used at R1 through R3.

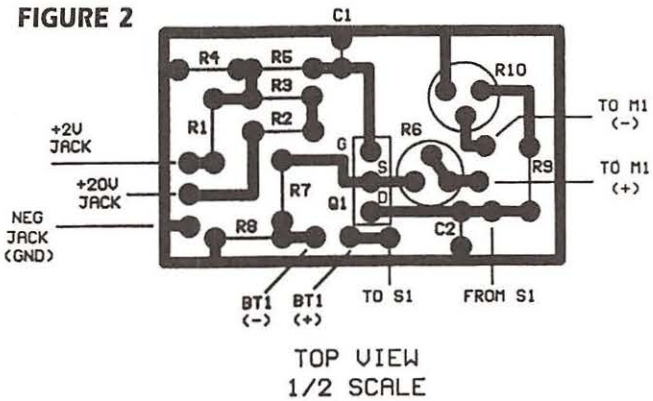
The figure 1 circuit may be used to measure voltages greater than 20 if additional series resistors and pin jacks are added. A range switch can be used with this circuit for selecting the meter input lines, thereby requiring only two pin jacks on the panel.

Construction Ideas

Figure 2 shows a circuit-board pattern for the main components of the figure 1 circuit. I made the pattern larger than necessary to provide more "elbow room" for beginners. Experienced builders may want to shrink the pattern to 75% of scale. Ample spacing for the parts would remain after reduction.

The components are soldered directly to the copper conductors on the etched side of the PC board. No holes need to be drilled. This simplifies construction and minimizes confusion.

FIGURE 2



PC board pattern and parts placement for the circuit in figure 1. The parts are soldered to the copper conductors on the etched side of the board, as shown.

You can use an artist's brush and enamel paint to protect the areas that are not removed during etching. An etch-resist pen or India ink can be used as an etch-resist agent too. Etch-resistant PC layout pads and tapes offer still another method for protecting the copper.

Etching may be done by immersing the protected board in ferric chloride solution (available at Radio Shack stores) for approximately 30 minutes. The solution should be preheated to 90-100 degrees Fahrenheit before etching commences. I do this by putting the solution in a pint-size canning jar and heating it in the microwave oven. About 45 seconds to 1 minute should suffice. This will hasten the etching action. Rinse the PC board thoroughly in clear water after etching is completed.

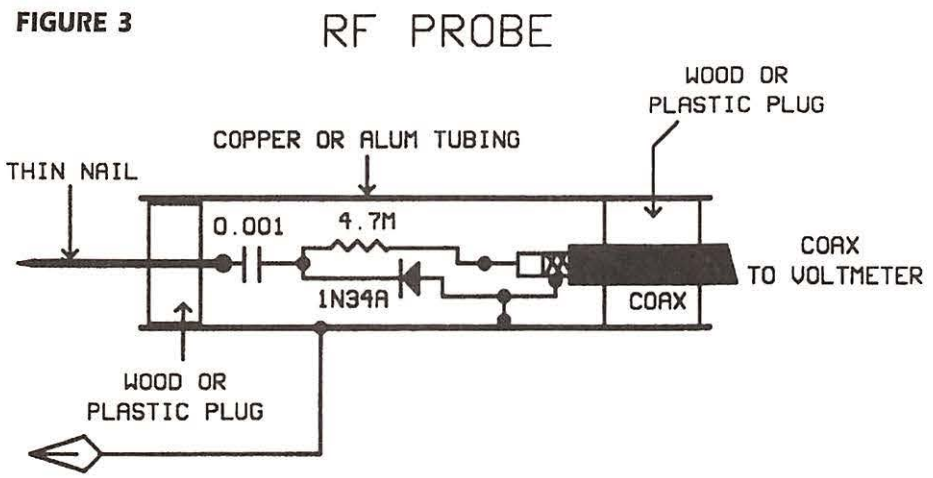
WARNING! Avoid physical contact with the chemical. Wash the affected areas immediately with soap and water. Do not breathe the fumes.

The assembled PC board, jacks, switch and meter may be installed in a project box of your choice. An inexpensive box can be made from sections of PC board that are joined at the seams with solder. Aerosol spray paint can be used to dress up the exterior of the box.

You may use a standard set of red and black test leads with this meter. Install three pin jacks on the meter case for access. If you use the RF probe in figure 3 it will be necessary to add a standard phone jack to accommodate it. An SPDT toggle switch can be added to permit switching the probe internally between the 2- and 20-volt pin jacks. The RF probe will require a PL-55 matching phone plug. RG-58 coax is suitable for the RF probe lead. Foam-filled coax is best because it's flexible.

Construction of the RF probe requires a copper or aluminum tube that is 3/4 or 1 inch in diameter. A tubing length of 4 to 6 inches is

FIGURE 3



Hybrid drawing of an RF probe that can be used with the circuit in figure 1. Other germanium diodes, such as the 1N60, may be used. See text for other RF probe details.

okay. The probe internal parts can be built on a thin strip of PC board stock. The end plugs (2) can be affixed by means of 4-40 screws (two at each end of the probe). Be sure to connect the coax shield braid to the metal probe tube. This can be done inside or outside the tubing. The coax cable should be glued to the end plug with epoxy cement. It is wise to abrade the vinyl outer jacket with coarse grade sandpaper before adding the glue. This will provide a better surface for the cement to adhere to. The probe tip (nail) can be held in place with epoxy cement. Alternatively, you may put a bead of solder on the nail at each side of the plug if wood is used.

Using the Meter

Calibration is the first order of business. Turn on the instrument and allow one minute for the Q1 transistor junction to heat. Set R10 for a zero meter reading. Next, connect a known voltage source (10 volts is great) to the 20-V jack. Adjust R6 for a mid scale reading on M1. When using a meter with a 0-10 or 0-100 readout scale, always remember to multiply the reading by a factor of 2. A skilled craftsperson may choose to make a new meter scale that has 0-2 and 0-20 volt ranges.

The RF probe is handy for measuring the signal voltage from oscillators or low-power transmitters. Point-to-point checks of RF voltage levels make troubleshooting a joy when working with RF circuits. The accuracy of the probe is best when it is used with a VTVM which has a 10-megohm input characteristic. However, it will provide reasonably accurate readings when used with the figure 1 circuit.

Accuracy depends on how clean the waveform is. A pure sine wave yields the most accurate RMS voltage reading. Waveforms containing harmonic currents and other impurities do not. Nonetheless, the probe is useful for relative measurements.

Tag Ends

Most of the parts for this project are available from Mouser Electronics[1] and Hosfelt Electronics.[2] A dedicated parts scrounger will save money by gleaning the components at a ham radio flea market, especially the 100-µA DC meter. Surplus vendors offer the best opportunity for locating low-cost parts and meters. Hosfelt Electronics sells a 100-µA meter (part no. 39-162) for a reasonable price. All Electronics Corp. also sells a 100-µA meter (part no. MET-42).[3]

The figure 1 instrument has many practical uses. It is ideal for lab work, automotive testing and RF power measurement. Keeping tabs on your NiCd and dry-cell batteries is a snap with this meter. When testing used batteries, always put a load across them before measuring the voltage. If the battery is partly discharged it may still provide a normal voltage reading. But, with a 50- or 100-mA load across it, the true voltage will be read.

For example, a 1-1/2 volt AA, C, or D cell should be bridged with a 33-ohm resistor to provide a 50-mA load. Use a 180-ohm resistor for 9 volt batteries. Do not connect the resistor until you are ready to measure the battery voltage. There should be no voltage drop if the battery is fully charged, or nearly so.

Notes

1 - Mouser Electronics, 2401 Hwy. 287 N., Mansfield, TX 76063-4827. Phone: 1-800-346-6873.
2 — Hosfelt Electronics, Inc., 2700 Sunset Blvd., Steubenville, OH 43952-1158. Phone: 1-800-524-5414
3 — All Electronics Corp., 14928 Oxnard St., Van Nuys, CA 91411. Phone: 1-800-826-5431

Jean Baker, KIN9DD

Tools for a Great Aero Summer

Welcome aboard! Sporty's Pilot Shop is advertising a new handheld scanner that looks as if it was made to order for aero buffs. The scanner is called the JD-100; it receives the civilian aero band (118.000 MHz - 142.975 MHz) *and* the military aero band (220 MHz - 399.975 MHz).

This is a full-fledged scanner with 20-channel memory, a priority feature, and a three-year warranty. The power source is four AA batteries. Cost is astonishingly low — only $150.00. It almost sounds too good to be true!

Available at additional cost is a 115 or 230 volt wall power adapter, a cigarette lighter power adapter, a carrying case, and a metal belt clip. Interestingly, it was made for Sporty's Pilot Shop by JAL Data, a division of Japan Airlines. This scanner should be ideal for air shows this summer.

For more information, Contact Sporty's Pilot Shop at (513) 735-9000; Clearmont County Airport, Batavia, OH 45103.

More Company Frequencies

(Continued from last month)

130.625: TWA - Boston (BOS); TWA Express Ramp - STL
130.700: American Eagle - JFK; ComAir - PVD; Delta - PVD; TWA - SLC; ARINC frequency on domestic net
130.750: USAir Shuttle - Bos & LGA
130.850: America West (Cactus) - BOS
130.900: Continental - DIA; Delta - Cincinnati (CVG); Delta - Atlanta Radio
130.950: Business Express - BDL; Manchester, NH (HHC); Bridgeport (BDR); American Eagle - JFK
130.975: TWA Express (Redbird) - PVD; American Eagle - JFK
131.000: Northeast Express - BOS; Northwest - RSW; USAir - PIT
131.050: TWA - JFK; PIT
131.075: United - ATL, DIA, RSW, BDL, PVD
131.100: British Airways Ops - ORD; TWExpress Dispatch - STL
131.150: American Eagle - Sarasota (SRQ), Naples (APF); Northwest - BDL; Delta Ops - ATL
131.175: TWA Maintenance - JFK; Longhorn Dispatch - SFO
131.300: Alitalia - JFK; AMR Combs - BDL
131.125: TowerAir - JFK, MIA;
131.350: Delta Shuttle - BOS; United - DIA
131.400: American Ops - MIA; Olympic - BOS; Skywest - SLC
131.450: Business Express - BOS; Delta - ATL, BNA, SLC
131.500: Air Ontario - BDL; American Eagle - BDL;

American Transair B-757, via Carolyn Stone, CA

131.525: American Trans Air Dispatch - IND (also used wherever Amtran has a hub — Midway [Chicago], Milwaukee, Philadelphia, Detroit, etc.)
131.550: America West Dispatch - IND
131.625: United - STL; DHL - SLC
131.675: Delta Maintenance - ATL American Eagle - BOS
131.700: Northwest - BOS, DIA; Southwest Dispatch - STL, BDL
131.750: American Ramp - BOS; El Al - JFK; Northwest - BNA
131.775: Blue Ridge - BOS, Islip (ISP); Lufthansa - JFK
131.825: FedEx - Many locations
131.850: Delta - ATL, BOS, BDL, FLL, RSW, PIT; Amtran - BOS
131.900: Delta Radio
131.925: FedEx - Many locations
131.950: Delta - CVG, PIT; American - DIA
132.000: Virgin Atlantic - JFK

Airline Safety Data

A few months ago, the FAA started to provide consumers with basic airline safety data. The FAA will release information about individual carriers that consumers have asked for in the wake of last year's fatal accidents involving passenger carriers. Agency officials said because airline accidents rarely occur, it is difficult to develop a meaningful rating system that would provide consumers with useful information for making a decision about which airline to fly.

Although most major U.S. airlines support the FAA's initiative to help educate the public about aviation safety, an American Airlines official said the agency "must be sure that what it tells consumers will be explained" so the public can understand it. But if the information becomes a competitive issue "airlines may stop sharing safety data" he said. A Delta Air Lines official said the carrier is "very happy" that the program will not rank airlines.

The agency is issuing information about new enforcement actions against airlines that involve civil penalties of $50,000 or more, as well as significant regulatory actions such as revoking a carrier's operating certificate. A dedicated page on the Internet (see **http://www.faa.gov**) contains safety information, including accident, incident, and near-mid-air-collision data. This type of data was previously available only through the Freedom of Information Act.

Coming, if not already here, is a data base specifically designed for the web page which will include basic information on airlines such as their date of initial certification and the types of aircraft they operate.

HOUSTON INTERCONTINENTAL

Houston Intercontinental	
Approach:	120.050 (North and East), 124.350 (West)
Departures:	119.700 (North), 123.800 (West), 133.600 (East), 134.450 (South)
Clearance:	128.100
Tower:	118.100
Ground Control:	121.700
ARTCC:	133.800, 132.950, 134.800

This 'n That

Air France will boost capacity on its daily nonstop between Washington and Paris by 50% this summer by substituting a 381-seat 747 for the Airbus A340. The airline will continue to operate 747s on many transatlantic routes, while U.S. carriers use the smaller twin-engine 767s and 777s. The only 747s between Paris and New York, Newark, Los Angeles, Miami, and Washington will be operated by the French Flag Carrier. It also serves Paris from Chicago, Houston, and San Francisco.

Although Air France's transatlantic flights are nonsmoking in passenger seating areas, it is equipping its aircraft with two stand-up smoker's bars for economy and premium passengers. The "bars" are enclosed by drapes and have special fans to draw smoke and fumes.

Japan Airlines expects operations of a new discount subsidiary, JAL Express, to begin in the first half of its 1998 fiscal year with two 747-400s. JAL Express will operate some of JAL's low-demand runs on a "wet-lease" basis (in which aircraft, flight deck and cabin crew are all leased together), and study the possibility of taking over some domestic trunk routes and international sectors. Cockpit crews will not be Japanese initially, although Japanse recruits will be sought later.

John Fulford, WA4VPY
email: johnf@emi.net

Summertime Skip and Federal Trunking

With the summer upon us, I am spending more and more time monitoring the federal bands for increased use in federal activity. What does this have to do with summer? The days are longer and the skip on the low bands is starting to roll in. I have been monitoring the ten meter ham band, specifically 29.6 MHz FM mode, for activity. When I hear ten meters open up, I know some good federal skip loggings are possible.

Most of the federal agencies have left the low bands for VHF and UHF assignments. The only real players one will hear down there are the military nets which show up in the 30 to 88 MHz area. As an example, Nellis Air Force Base in Nevada, the home of the mysterious Area 51 activity, has been monitored and confirmed (thanks to the Milcom internet mailing list) on these frequencies :

32.45 32.65 34.15 40.15 41.45
41.95 46.75 46.85 46.95 MHz

These transmissions are probably coming from a military backpack radio, such as the PRC-77 or its mobile equivalent. How can we tell these are tactical, rather than standard land mobile transmissions? The secret is the subaudible tone that is transmitted along with the carrier. This is often referred to as Private Line. (The term "Private Line" is a Motorola trademark. General Electric and other land mobile manufacturers have similar trademarked names.)

The subaudible tone transmitted is 150 Hz. This is the standard military tone. It is *not* a land mobile standard tone. The closest tone there is 151.4 Hz. However, if you are monitoring with a scanner than has subaudible tone capabilities, the 151.4 Hz tone is close enough. The military 150 Hz tone will pass through.

Trunking in Vogue with Military

More and more military bases are going over to 400 MHz trunked radio systems. The standard discrete frequencies which were used for fire, police, maintenance, are being deserted in favor of the 400 MHz frequencies. The following trunked systems have been reported in use in the areas around Washington,D.C. This information is courtesy of the SCAN-DC internet mailing list and was submitted to them by Willard Hardman.

MARYLAND

Aberdeen Proving Grounds:
406.700 407.275
407.475 408.550
409.025

Edgewood Army Arsenal:
406.225 407.250
409.500 410.150
Note: Seven channels approved, only the above four in use.

Andrews Air Force Base:
406.350 406.950
407.150 407.425
408.025 408.200
408.750 408.950
409.350 409.725
Note: Almost all base functions, including the Naval Air Facility.

Baltimore Federal Agency Trunked System:
406.425 406.650 407.050
Note: Approved for five channels. Other two channels not known. System not in use yet.

Baltimore Health and Human Service:
Approved for five unknown frequencies. Not in use yet.

Baltimore Health and Human Service:
409.000 410.225 410.425 411.825
One other frequency not known. System scheduled to be in operation in late 1997. This will include the National Institute of Health.

Cumberland Federal Prison:
Five frequencies approved. No other information known.

Fort Detrick:
407.075 408.550 409.150
Note: Five channels approved. Only above three in use. Mostly military police, fire, base maintenance.

Fort Meade:
406.325 407.400 407.575 409.450
Note: This is for the Army facility, not the National Security Agency installation. Approved for five channels. Only the above four in use.

Goddard Space Flight Center (Greenbelt):
408.150 408.625
409.525 410.275
Note: Monitors say this is very active system.

Patuxent River Naval Air Station:
410.150 411.325
412.050 412.750
Note: Five channels in use. Other channel not reported. Tenant units and aircraft division still use VHF/UHF.

WASHINGTON

Washington Navy Yard:
Five channels approved. Appears to have merged with Washington's federal system, managed by the National Telecommunications and Information Administration (NTIA).

Washington NTIA System:
406.250 406.850 408.450 408.700
408.900
Note: Eight channels approved, only the above five in use. This is the ***federal*** trunked system in D.C. area. The users include Department of Defense, Bolling Air Force Base, Naval District of Washington, Holocaust Museum, National Archives, Supreme Court, Naval Intelligence Center, and several others. The local "shorthand" for the system is "DC1."

Washington Military System:
406.200 406.300 406.525 406.775
407.025 407.950 408.850 409.250
411.200
Note: This is the ***military*** system in Washington. The users include mostly Army units. These include Fort Belvoir, Military District of Washington, Joint Military Intelligence College, Defense Information System Agency, White House Communications Agency and

others. The local callsign is "Belvoir/Tysons."

VIRGINIA

No trunked systems have been noted coming from Virginia. Both Dahlgren (Navy) and Fort A.P. Hill have approved requests for systems, but nothing has been operational yet. Systems have been approved for Langley, a federal trunked system for Norfolk, Norfolk Navy Station, and an Army system for Richmond.

More DC Area Systems

As an addition to the Washington trunked traffic, the Food and Drug Administration is now operating on the Washington federal trunked system (406.250, 406.850, 408.450, 408.700, and 408.900 MHz).

One monitor reports the Defense Communication Electronic and Evaluation Test Facility at Ft. Belvoir, Maryland, is using the frequencies of 141.425 and 142.400 MHz for their operations.

It has been reported that the U.S. Supreme Court building security is on 163.275 MHz simplex with a subaudible tone of 127.3 Hz. The base identifies as "G2." The drivers/escorts for the Supreme Court Justices are now on the Washington NTIA system. The G2 base simulcasts on both the 163.275 MHz and the NTIA trunked system.

The U.S. Park Police have maintained a UHF radio system in Washington, D.C., for many years. This system operated on 411.625, 411.725, 411.825, and 411.925 MHz. This system is now reported as "officially dead." The 411.825 frequency has been reallocated to part of a trunked system. However, 411.625 and 411.725 are occasionally used by the Park Police for informal simplex traffic.

There is a mystery coming out of the Washington, D.C., radio traffic. Several monitors have reported on the SCAN-DC newsgroup of unusual activity on 411.975 and 412.350 MHz. During the last few weeks voices speaking mostly English with a heavy foreign accent have been noted making references to ambassadors and motorcades.

These frequencies carry occasional tones, often six or so, each about 1/4 second in length and about the same time apart. The tones are approximately 1 kHz in frequency and can be overridden by a voice transmission when it is initiated. Similar tones have been encountered on 165.6875 MHz, which is a Secret Service frequency. The voice traffic is often distorted and the signal seems to be coming from downtown Washington.

One answer to this comes from *MT*'s Larry Van Horn. His records show the two frequencies are assigned to FEMA. They are supposed to be repeater outputs for FEMA repeaters in the Washington area. The particulars are:

Output/Input:	Callsign	Location
411.975/408.725	KPS275	Washington FEMA Headquarters
412.350/408.775	KPS262	Virginia FEMA site

What is FEMA doing with executive/diplomatic protection? If it is not FEMA, who is using their system?

Great Day for the DEA

April 18, 1997, will go down in history as one of the most active monitoring days in recent memory for the monitoring of counternarcotics traffic on shortwave coming from Customs and the Drug Enforcement Administration (DEA).

The following frequencies were handling major counternarcotics traffic. All frequencies were monitored in upper sideband (USB) and are of course, in kHz:

11175	10242	8968	13907	10242
11494	8971	8912	11073	14686
7657	15867	18594		

The DEA HF frequencies of 11073, 14686, 8912, and 7656 kHz had the following units on them:

7656--Atlas calling Sundance
8912--Omaha 57B calling Hammer, then encrypted voice
11073--Atlas calling Sundance (Cochibamba, Bolivia)
14686--Atlas calling Sundance

Just from what clear voice was monitored, it seems DEA had a plane missing. No further details were released. DEA was chasing a large truck over some backroads in Mexico using 11494 kHz.

DEA operations in Mexico and the Americas use 7657 kHz as the normal Foxtrot frequency. The frequency of 11073.5 kHz is designated as Sierra Echo. The frequency of 11076 is designated Echo. Callsign Condor 100 is Mexico City. Sundance 855 is the regional DEA office in Cochibamba, Bolivia.

US Customs was reported with encrypted voice on 10242 kHz. US Customs Unit 2337 was monitored with encrypted voice. The frequency then jumped to 13907, 15867, and 18594 kHz.

Customs in the Pacific

While we are discussing Customs, a monitor who wishes to remain anonymous passes some traffic regarding the US Customs Office of Enforcement repeater system in Hawaii.

The frequency pair of 165.4125/166.6750 is used on the island. The agents identify with the standard "Alpha" callsigns then switch into DES scrambling. Most operations are reported in the clear. Units Alpha 81 and Alpha 17 were monitored following a vessel in the Hawaii area suspected of transporting narcotics. Alpha 17 was on a vessel in the Honolulu harbor. Alpha 81 was a 41 foot Coast Guard cutter. Communications were also heard on Marine Channel 69 with an unidentified Navy vessel in the harbor.

Conclusion: You never know where you will hear federal activity....

It is interesting to note that the above repeater pair does *not* show up for any other government agency and does not show up for any other known Customs system. 165.4125 is used by Customs in Alabama, California, Florida, Hawaii, and Louisiana. 166.675 is only used by Customs in Hawaii.

As a closing note, one of our readers sent me some e-mail on frequencies used by the Bureau of Mines. I erased the e-mail and did not get his identity. If he/she is reading this, please resend the message. Until next month, keep monitoring!

Ken Reitz, KS4ZR
e-mail: ks4zr@compuserve.com

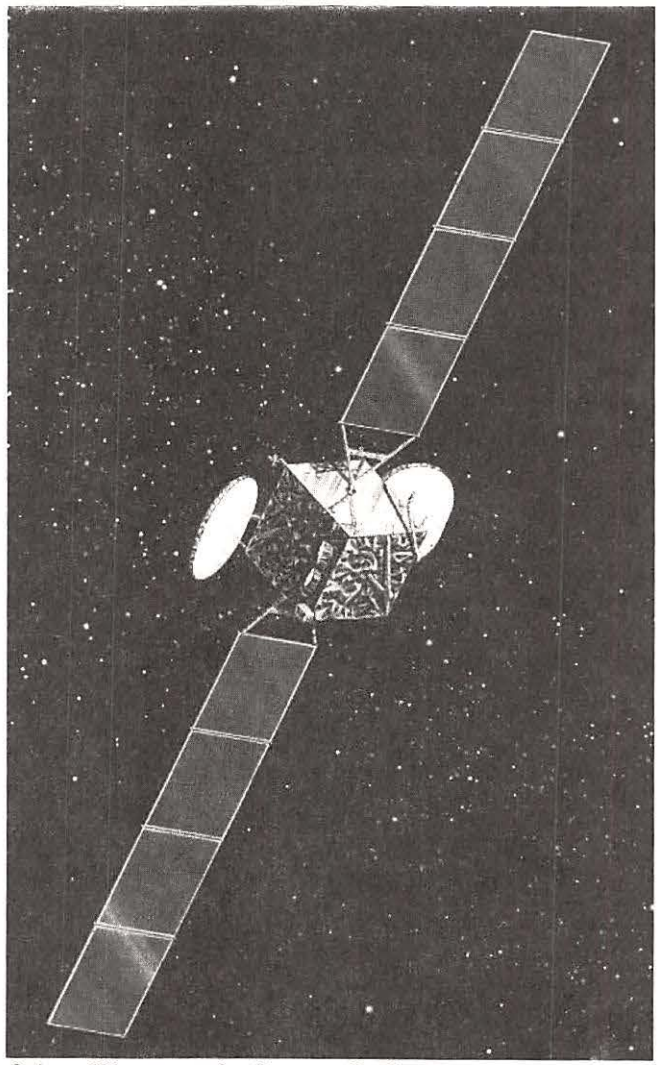
Galaxy 4: One Versatile Satellite

Technology is a thing of fragile beauty. It seems that the more complicated things are, the less it takes to cause a malfunction. If you have a DBS satellite system, you should appreciate its simplicity, the fact that there are no moving parts, and that the system is made with as few components as possible. While such non-steerable systems do have their disadvantages, DBS engineers have certainly learned from the C-band satellite industry that the fewer parts you have, the less can go wrong.

I often think about where, in the Clarke Belt, I'd like my C-band system to break down. Of course, we don't usually have a say in such matters, but it's a fun exercise anyway. In the years before the advent of scrambling, Galaxy I was the place to be. It featured 12 channels of cable fare and lots of audio subcarriers.

A few years ago I thought that Anik E2 would be a good place to break down. Before it suffered an unfortunate malfunction, it featured 24 channels of C-band and 32 Ku-band channels. Those channels were loaded with video including network feeds, back hauls, dozens of audio subcarriers, data signals, SCPC, and more. Sadly, it is but a shadow of its former self after suffering the loss of one of its solar panels and half its capabilities were shut down.

If you're scanning the skies for a great example of satellite versatility you needn't look farther than Galaxy 4, a sky-bound workhorse which provides an excellent study of the art of satellite design. It successfully answers the question of how much data, video, and audio can we cram on one single satellite.



Galaxy 601 spacecraft - Courtesy Hughes Space & Communications Co.

Multi-faceted Galaxy 4

Before we get into the details of this satellite, let's look at the transmission parameters. In order for signals to get from the satellite to your dish they have to be transmitted from the ground to the satellite. Obviously, the trip up (known as the uplink) can't be made on the same frequencies as the trip down (known as the downlink). All two-way satellites provide a different set of frequencies on the uplink than on the downlink, just like your local 2 meter ham repeater. In the case of satellites such as Galaxy 4, the uplink is done in a band from 5.925 GHz to 6.425 GHz on C-band and 14.0 GHz to 14.5 GHz in the Ku-band.

Galaxy 4 (G4), a product of Hughes Aircraft and their long line of successful HS601 satellites, was launched from Kourou, New Guinea, aboard an Ariane 42P rocket on June 24, 1993. It has a design lifespan of 12 years. This bird features 24 C and 24 Ku-band channels which carry everything from network programming and sports back hauls to dozens of SCPC signals and data transmissions — such as EMWIN, the Emergency Managers Weather Information Network. It is, in short, a satellite DXer's playground.

Weighing in at 3,700 pounds and measuring 80 feet across (with solar panels extended) and 22 feet high, G4 is perched at its orbital slot in the Clarke Belt at 99 degrees west. G4's C-band channels offer the standard 16 watts output while its Ku-band channels provide crisp video via 50 watts output.

Here you'll find samples of digital transmissions, several different scrambling methods, audio subcarriers from SCPC to FM squared, foreign broadcasters, religious programming, network, news, and sports back hauls, syndication distribution, and some digital feeds which you can't even tell exist.

G4's C-band Side

The C-band side of G4 is the one most familiar to satellite TV viewers. It's home to the main network feeds of the CBS television network as well as their primary affiliate newsfeed, the main feed for the Warner Brothers network, and the United Paramount Network (UPN). While CBS is a long-time resident of G4, many other current occupants migrated from Telstar 401 when it went down in January of this year. The CBS network feeds are mostly sent via the Videocipher I encryption system; however, there are almost always one or more feeds in the clear.

Other video residents on G4's C-band side include the long-time religious broadcaster known as the Shepard's Chapel Network originating out of Arkansas, and the relative newcomer World Harvest TV. Syndicated program distributors Buena Vista TV and 4 Media Co. have feeds here as well.

In addition, there are five occasional-use channels which are used for college sports back hauls and news feeds. On any fall or

winter weekend, it's not unusual to find five college football or basketball games here. Former analog broadcaster SCOLA is also here but in a digital format not compatible with the new General Instrument 4DTV receiver.

The satellite hosts eight audio subcarriers including KRVA-FM, Arkansas; WHME-FM, Indiana; English and Spanish feeds of shortwave broadcaster WHRI; and a variety of easy listening and big band swing audio channels.

Two channels (1 and 3) are used entirely for Single Channel Per Carrier (SCPC) transmissions. Channel 1 features audio from the Voice of Free China (Taiwan); KBLA-AM (Radio Korea); WWRV-AM New York City with religious programming in the Spanish language; and only a handful of others. Channel 3, on the other hand, is like having a dedicated sports/newstalk radio which features nearly every major league sports franchise in the country as well as many college sports networks and what seems like dozens of Rush Limbaugh sound-alikes including the big guy himself.

Whether it's Major League Baseball, NHL, NBA, Motor Racing Network, college football, basketball, or baseball you're most likely to find it here. But wait, there's more! There's Minnesota Public Radio, National Public Radio feeds, at least three reading services for the sight impaired, and Soldier's Radio Network from the U.S. Army.

G4's Ku-band Side

I'm always amazed at how few people have Ku band reception capability. True, there is the extra cost involved: you'll need a C/Ku feed and a Ku LNB. Between the two extra components you'll spend another $150 to $200. But, for most die-hard satellite DXers, it's money well spent. Virtually all receivers made today are Ku compatible and nearly all installations include the extra run of RG/6 for the Ku LNB. There are 16 Ku band satellites with anything from a few to many active channels.

Galaxy 4 makes great use of all 24 of its Ku-band channels. Nearly every conceivable transmission mode is found here from digital data to analog video. You'll find FM Squared commercial-free music services, full-time video from mainland China, and an interesting mix of sports and news back hauls.

One disappointment to most satellite DXers is that many video channels on the Ku side are either encrypted or in a digital format. The Filipino Channel is on channel 24 and scrambled via the Oak/Orion system; the Chinese Jade Channel is using Videocrypt on channel 18; CNN's Airport Channel is on channel 10 in Scientific-Atlanta's digital MPEG transmissions. One interesting aspect of the Filipino Channel is that while its video is scrambled, it offers two audio subcarriers, DZMM (6.20 MHz) and WRR (Romance Radio 6.80 MHz) which feature a mix of American and Filipino pop as well as chat shows in Tagalog.

Of particular note here on G4 Ku, is the number of FM Squared audio subcarriers found on channels 3 and 16. This type of subcarrier differs from normal audio subcarriers in that they are found at frequencies below those usually received by most satellite receivers. Use of an out-board subcarrier receiver which can tune those signals, such as the Universal SC-50 or the Maspro stereo processor, with a frequency translator, are required for reception.

These channels carry many audio services for America's large chain-store retailers. These so-called "in-store services" feature advertisements for various specials now running in the store. I've heard news networks here as well as an American Public Radio Network feed. The music services found on these channels range from Country & Western to '70's rock with several Latino channels. Universal's "Satellite Radio Guide" shows 14 different music frequencies on both channels 3 and 16. The audio quality is excellent and makes for some enjoyable, commercial-free listening.

On the digital data side, in addition to the aforementioned EMWIN signals, is the data stream for Planet Connect, a digital service which downloads Internet data to subscribing customers. There are also a number of unidentified packet signals noted on FM Squared frequencies.

Introduction to TVRO

If your family is enjoying the offerings of cable TV or a DBS system but you're looking for more interesting viewing and listening, setting up a dish just for Galaxy 4 is a good place to start. You can get a nice used mesh dish for well under $100 and a good analog receiver for less than that. If you hunt around and make some inquiries, you'll find it's not hard to buy a complete system for less than the price of a cheap scanner. After spending some time on the installation you're ready to go. Later you can add a C/Ku feed and a motor and really start DXing the Clarke Belt!

Transponder Notes

• Big changes in the satellite industry are always on the horizon. Two years ago it was the birth of the DBS world. Right now it's the merger of DISH and Murdoch, the launch of the General Instrument (soon to be known as NextLevel) Digital-VCII-Analog receiver called 4DTV.

There's also the less noticed but extraordinary take-over of the sports broadcast industry by FOX (more Murdoch mania). In just a few months, no fewer than seven cable sports networks are now Fox Sports Networks: FOX has secured over-the-air broadcast rights to most major league sports, including prime events like the Super Bowl, Stanley Cup finals, and World Series. The FOX sports show *Scoreboard Central* is seen almost everywhere. It's not hard to imagine that we have not seen the end of the Murdoch Effect.

• By the time you read this, look for Telstar 5 to be up and running. With 24 C-band and 24 Ku-band channels on board, T5 will be found at 93 degrees west which will put it squarely between Galaxy 7 and Galaxy 3R.

With a dismal first year performance, AlphaStar has been playing corporate musical chairs with the ousted president Murray Klippenstein being replaced by old TVRO hand Dave Charles.

Bill Cheek
email: bcheek@san.rr.com

Computer Tools and Utilities for Radio

Some believe radio is going to the dogs, some believe it is going to computers, others believe they're one and the same thing. If that's you, then your vision differs from mine. I see automation and computing hard at work across the entire radio scene. Even CBers are playing packet-radio! Yes, I find less to listen to, but a whole lot more to decode and process with my computer.

The early days of my computing experience were full of fumbling and stumbling — the connection between hobby radio and computers not really apparent — but I sensed something coming down and stuck with it. Paydirt came slowly in those early years, but I persisted and now there is no turning back. Radio is a monstrous picture all by itself, and when you add computing, it becomes an understatement to call the panorama "mind boggling." And yet, sense and organization can be made from this chaos ... with a computer and a few of the right tools.

Which Computer?

I doubt there is a "best" computer for radio, but my choice and expertise is on the IBM-PC and compatibles. If you are attached to another platform, I refer you to the Internet where information on most anything can be found. But if you are undecided which way to go, I have to recommend the PC/compatible as the computer most capable of steering you down the righteous path in radio.

There are at least six levels of PC/compatible computers, the earliest of which is the now horribly outdated PC. The PC was followed by the XT, AT, 80386, 80486, Pentium, and now the Pentium II. There is no foreseeable end to it.

While the original IBM-PC is an antique, its successors are still suited for most radio needs. The XT and AT are marginal in performance and capacity, but I know guys who extract a lot from those old clunkers. You can fare well with a cheap used 386 or 486, so long as your needs don't extend much beyond radio.

If you are in the market to buy a new computer, settle for no less than a Pentium 133. If you dream of connectivity to the Internet and beyond, as well as some serious radio, and a modicum of production on the side, you have little choice but to go for a fast 486DX4/100 or better. Yesteryear's XT, AT, and 386 are too far behind the times to be expected to do more than keep your nose just out of the water.

I'll confess that I built a cheap 386 machine with 12-Mb of RAM and a 520-Mb hard drive, solely for the purpose of economically playing radio and communicating when I'm on the road in my van. That machine is equipped with a WinRadio; the CE-232 Scanner/Computer Interface on a PRO-2004; a high speed modem; and an Internet connectivity package — all running under Windows 95 with Microsoft Works for Windows 95 handling the production side. Total power requirements, including that of a 14" SVGA monitor, are well within the specs of Radio Shack's 220-watt Power Inverter, #22-138.

My theory is that an accident or theft wouldn't bite so hard as if I had an expensive Pentium system for all that work (and play). In actual practice, the machine proves eminently capable so long as I steer clear of the high-powered production packages like Microsoft Office 97, etc. My mobile 386 desktop is quite capable of running WinRadio and the CE-232 Interface at the same time as I crank out articles and databases from Microsoft Works, and surf the 'Net via a cellular telephone connection. The moral is that a cheap 386 can still do a lot even though it belongs on the scrap heap.

Which Software?

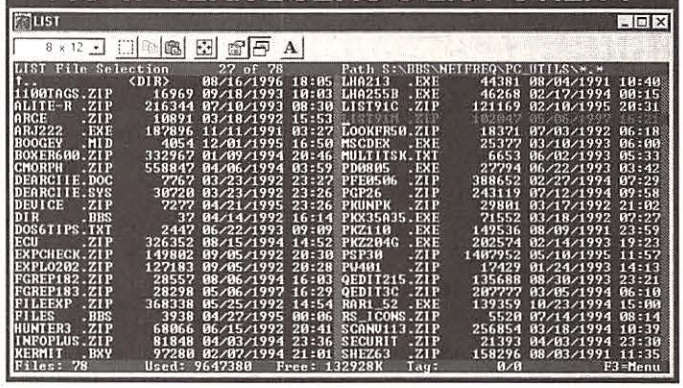
I'll reiterate that **Windows 95** is the de facto standard operating system for a wide range of MS-DOS and Windows applications. Microsoft **WORKS** for Windows is a premier, low-cost, productivity package that's good for hobbyist, home, and small-business needs. I've covered these in detail in the past, so let's move on to other goodies that you may not know about.

The rest of this article highlights some slick and wicked utilities for broad computing needs. Most of these tools aren't directly related to radio, but anything that makes you a better *computist* might also make you a better *radioist*. The following goodies will contribute to your computing power:

Vernon Buerg's LIST
McAfee's TARGET
Chris Dunford's FGREP
Reid Drummond's APFTools
C.A.T.'s MAGIC
PC Magazine's WHEREIS
Semware's QEDIT
Semware's TSE
Microsoft Windows' NOTEPAD

Vernon Buerg's renowned **LIST** is an MS-DOS general-purpose directory navigator, file browser, and file viewer utility. Features include file selection/utility menu, selective printing, telephone dialer, scrollable windows, and viewing files within archive files. List works perfectly under most versions of DOS and even in a DOS box in any version of Windows! With List, you'll never need the arcane DIR command of MS-DOS. I couldn't live without my List tool, the latest shareware version of which is: LIST91M.ZIP. Believe me, List will make a difference in your life with power that even Windows' File Manager and Explorer can't match. Cost is negligible.

FIG-1: VERN BUERG'S LIST UTILITY



McAfee's shareware **TARGET** is a little-known whopper of a file locator and multipurpose manipulator utility. It can find selected files across all drives, including logged network drives, and initiate actions on those files such as virus scanning, file copying, renaming, re-grouping, deleting, archiving, and multiple other functions. It can search and make decisions based on date ranges, file sizes, archive condition, file types or duplicate files, and it can use a variety of search masks, including regular expressions. Cost is minor.

Target can perform a wide range of manipulations on files that are found, ranging from simple deletions or scans for viruses, to complex restructuring or reordering. Most Target tasks can be performed with one simple command. Target is available in v1.5 as: TARGET15.ZIP 75422.

Chris Dunford's shareware **FGREP** is now

FIG-2: FGREP's COMMAND STRUCTURE

in v1.83 as FGREP183.ZIP 28298. FGREP (Fast GREP) is a small utility that can be used to find strings of characters inside ASCII text files, and arbitrary sequences of bytes in other files. String search capabilities are not extensive (no regular expressions), but FGREP is small and very, very fast. FGREP is a little like Windows 95's Find function, but it is much more powerful and faster, especially for word and phrase searches across large numbers of files. Admittedly, FGREP is not ideal for the novice, but I futzed around with it as a neophyte and benefited immeasurably. You might, too. Cost is zilch.

Reid Drummond's **APFTools** is a superb MS-DOS frequency "finder" and organizer for chaotic text files and an APF file-preparer for the CE-232 Interface. APFTools was extensively discussed in my Dec-96 and Jan-97 columns and will not be repeated here except to advise that v4.1 is out now.

Computer Aided Technologies, a regular *MT* advertiser, pitched their hat into the ring with **MAGIC**, a remarkable Windows style of APFTools. (*See p. 84 for Catalano's review of it.*) MAGIC not only makes order and sense out of disorganized text file frequency lists, it can prepare APF files for the CE-232 Interface; FRQ and SCN files for ScanCat software; TXT tab-delimited column files; DBF dBase files; and ordinary comma-delimited ASC files. MAGIC reads any ASCII file, even those with no consistent column alignment, and parses to the best of its ability for single and multiple frequencies in a line of text; separates the frequencies from the text, with individual fields for the frequency, Mode, Increment, and text for Description and Comment. MAGIC creates one record per frequency. Additionally, MAGIC can directly read ScanCat, dBase, and comma-delimited files! A free demo of MAGIC v1.1 is available as: MAGIC.ZIP 498945

FIG-3: C.A.T.'s MAGIC

PC Magazine's **WHEREIS** is an old plain-jane, but fast file-finder. It's still useful and works under MS-DOS and Windows of all flavors. Whereis is tiny, thorough, and best of all, free. It belongs in every 'Net warrior's toolbox. Look for WHEREIS.LZH 1280 03/23/1992

Semware's shareware **QEDIT** and commercial **TSE** text editors are pretty much without equal. If you ever used the old MS-DOS EDLIN text editor, you'll know what I mean. Even the more recent EDIT.EXE of MS-DOS 5.0/up lacks the essentials of an all-purpose text editor. EDIT.EXE gets you by for basic ASCII editing, but after you've used QEDIT, you'll wonder how you ever managed without it. TSE (The Semware Editor) is an even more enhanced and powerful evolution of QEDIT, now in both 16-bit and 32-bit power. TSE is commercial-ware and must be purchased directly from Semware. I won't say you have to have TSE, but QEDIT belongs in your warbag, for sure.

Microsoft's own **NotePad** text editor that comes with all flavors of Windows is widely overlooked and scoffed at, even by yours truly. But you know what? I use it a lot. NotePad is one of those deals where "less is more." It's simple and unobtrusive, not powerful or loaded down with features — it just works flawlessly, the way an ASCII text editor should. A good half of my text editor/reader needs are done with NotePad. Give it a second chance, if you haven't already.

Conclusion

Some people use computers for specific purposes and then turn them off. Others, myself included, use computers for a variety of purposes and never turn them off. The difference between these two extremes might be the tools! The better you can use your tools, the better your product as well as the quality of your life. The right computer tools might make such a difference, and the ones I listed in this article are worthy of your attention and exploitation across a multiplicity of purposes. All are available from my FTP sites as well as around the Internet.

Error In May-97

Good grief, I blew it in Figs 1-3 in my May-97 column, page 82. Capacitor C-2 is in the wrong polarity. Its connections should be reversed from that shown, with (+) to ground and (-) to Pin 4 of the LM-741. Operated as shown, C-2 will probably fail due to reverse polarity. Thanks to Phil Accardi (AJ1N), Jerry Smith, and others who pointed out this awful oversight. Please make pen & ink corrections to your May-97 issue.

Please Note

Please note my new e-mail address and 24-hr direct connection to the Internet. Also note that my BBS, The Hertzian Intercept, closed for good on May 31, 1997. It is being replaced by these bigger and better Web and FTP sites.

E-mail: bcheek@san.rr.com
WWW: http://ourworld.compuserve.com/homepages/bcheek
FTP: ftp://ftp.cts.com/pub/bcheek or ftp://204.210.20.47
FAX: (619) 578-9247 anytime
Postal: PO Box 262478; San Diego, CA 92196-2478

John Catalano, PhD
j_catalano@conknet.com

Fresh Frequencies and CAT Magic

So much is changing these days. It seems that every time we pick up a frequency list the stations and the frequencies have changed. A check of Larry Van Horn's column proves that even the military is doing it! So how do we stay current instead of just searching signalless noise?

Common sense tips

First, find current, reliable sources of frequency data. Start with publications. Since the lag between writing and publication can be two or more months, check for the "freshness" of the data. Many publications have Internet web sites which are updated almost daily; some hourly. Again Larry's Utility page (**www.grove.net/~larry/uteworld.html**) World Utility News (WUN), WWW SWL Guide (**www. ee.mu.oz.au/staff/pbd/SW/index.html**) are good web sites for starters.

Second, subdivide your sources into categories; for example, those which have military or aeronautical frequencies. Prioritize them according to your personal favorite monitoring habits.

Third, cross check information between sources in order to determine which have the "freshest" data.

Now What?

OK. We now have various sources of frequency lists: printed page, word of mouth, and files from the Internet. How do we get these into a form we can use in our favorite receiver control and data base computer program? For the frequencies that we have heard from a friend, or hastily written on a scrap of paper, it's keyboard finger exercises! We could say this for all the sources, but then we would never get time to actually do some monitoring. Fortunately, there are time-saving alternatives for the others.

Page scanning 1997: cheaper and better

A year or so ago we looked at the results obtained using handheld page scanners to input printed frequency lists. I bought my handheld page scanner primarily to transform magazine frequency lists into computer files. I thought it would free me from all the time consuming keyboard and reading effort. From your letters and e-mails, many of you had the same plan.

Unfortunately, we were all disappointed with the results. I had successfully used a flatbed page scanner at a major electronics company, my employer at the time, but $1500+ for a flatbed scanner was not an option for most of us. By 1997, however, the electronics industry has followed its usual path and flatbed scanners are now less than $400. The demonstrations I have seen produce very reliable optical character to computer character (ASCII) results. Again, care must be taken to load the page squarely in the scanner. But it is a whole lot easier than the handheld.

I am planning to make one of these my very next purchase (Yes, dear: *after* I purchase a garden chipper/mulcher), so stay tuned for results on the new inexpensive flatbed page scanners.

How about Internet files?

Computer files come in all different formats. The most basic is called ASCII. This goes back to the very roots of computing when an industry common method for representing alphanumeric characters was developed. But lots has happened since then and over twenty different formats are in use, not to mention database formats. Using the Internet you'll find the most common are HTML and ASCII. When you add to all of this the fact that different receiver control and database programs arrange data very differently, things become real messy.

It can be done and many receiver control programs such as ScanStar, Scan Manager, and ScanCat have a "convert" option. These convert programs are generally far from automatic. Usually, the user needs to section off the data in the source file and indicate which is frequency data and which is station data. Also the user must indicate how the data is separated. For example, the data can be separated by commas, spaces, or other characters. In my opinion, none of the convert procedures included with the programs are second nature. Unless I use them on a regular basis, each use requires rereading the manual, a couple of test tries, and ten minutes of effort before I have success.

It would be very nice if a program could be developed which would do all the file conversion with a few mouse clicks. It would take a magician to convert a file, even of just the two most common file types, to a specific database format with no user judgement calls.

Well, "Magic" is just what a brand new program by Computer Aided Technologies, makers of Scancat, claims to do for ScanCat program users. Let's give it a try and see if it's real or illusion.

Works Like "Magic"

These are the words that appear on the opening screen once you have installed Magic version 1.1 in either Windows 3.1 or Windows 95. The computer requirements are modest: Windows 3.1 on a PC compatible with at least 4 Mb of RAM and hard drive space. Of course, you will need a version of ScanCat so you can use the resulting files in FRQ or SCN formats. The installation is quick and easy from the single Magic disk. The 18+ page Magic instruction manual warns that an error message (that should be ignored) may show up when installing in Windows 95. I found that it was also displayed when installed in my Windows 3.1.

Just pressing the screen "button" when the error was displayed, allowed the installation program to proceed without a problem. Once installed and running, a detailed instruction manual is available along with thirty sample

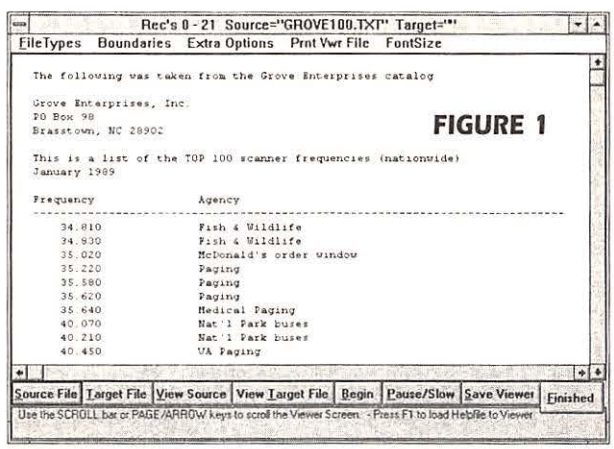


FIGURE 1

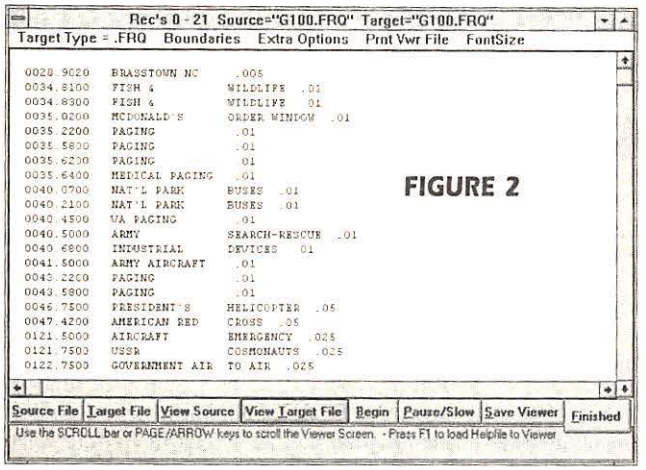


FIGURE 2

ASCII (TXT) files that you can convert.

Becoming a magician

All the control buttons required to use Magic are positioned along the bottom and top of the text screen, Figure 1. Here we have clicked on the first button on the bottom left "Source File," and chosen *Grove100.txt* as our source file, which is visible in Figure 1. You can see that the data is arranged in two columns separated by a number of spaces. But this is a TXT file format, not FRQ which ScanCat understands.

What file type do we want to convert *Grove100.txt* into? Selecting the "Target Type" command on the top left brings down a number of choices: Scancat FRQ, Scancat SCN, Text TXT, Comma separated ASCII ASC, DBASE DBF or CE-232 APF. For our example we want to make the converted file readable by Scancat, and therefore an FRQ. This is done by highlighting and clicking FRQ.

Clicking the bottom "Target File" button we are asked for the name we want to give the converted target file. We have entered the name *G100*. The .FRQ will be added automatically. Clicking "Begin" makes it all happen in seconds. The resulting *G100.FRQ*, file shown in Figure 2, works perfectly in Scancat! It took just six clicks and no user "judgment calls." Not bad.

That first try was with a file provided by the makers as a demo. Now let's go live to the Internet and download a file at random. This will be a real road test.

Going to the World Utility News (WUN) Logs Column on the Internet we will put Magic through its paces with a 304K sized file. Magic took about two minutes to read the HTML source file, *LOGS.HTM* shown in Figure 3. Because a Scancat FRQ file can only hold 400 records we'll convert this massive file into a Scancat SCN file. Let's try just hitting "Begin" and see what results without file preparation or user editing.

Out jumps a rabbit ... almost

Well, 4636 file entries and 8.5 minutes later, a perfectly readable SCN Scancat file resulted. Figure 4. But is the data correct? Well, almost. Some frequencies, not many, look strange and may not have been converted correctly. For example, I don't think we'll hear Tallin Air, a commercial airliner, on 1441 MHz as the converted file indicates.

Magic assumes certain facts about the numbers it reads. It converts all numbers with spaces on either side, to frequencies in megahertz. This is performed by assuming that numbers without decimals have a value greater than 2000. If the number does not have a decimal point and is above 2000, then Magic puts a decimal after the last three digits on the right. For example 123456 would be converted to 123.456 MHz. But if the number is really a *time*, as in our Tallin Air example (1441 or 2:41 pm), Magic still makes it a frequency. So 1441 (2:41 pm) becomes 1441 MHz — oops! I found that the best way to edit these bogus conversions was to delete them once they are in Scancat.

There are a few other minor bugs in Magic version 1.1. When we maximize the Viewer, the left side of the screen goes blank, chopping off text. Then if we minimize the Viewer an "Invalid Property" error results closing the whole program. I guess the "Finished" button must always be used to exit from the maximized Viewer. On the other hand, these may be problems related to my specific video card: Let me know if you have similar problems.

Magic version 1.1 is not perfect. But it's a very good start and indispensable for anyone who uses Scancat and downloads frequency lists. Using Magic was still far, far easier and faster than keyboard entering each frequency or any convert program I have used. Magic, version 1.1 is available from Computer Aided Technologies for $34.95 (+$5 S/H in the USA). Their order telephone number is 1-888-SCANCAT.

Keeping busy

This month we have found sources of frequencies, and methods of loading data into our receiver control and database programs. Just try any one of these computer assisted methods and you'll always know where to tune for action.

Hey, Sweetheart: Do we really need a garden chipper/mulcher? I'm sure WE can find more important things that WE can do with the money!

FIGURE 3

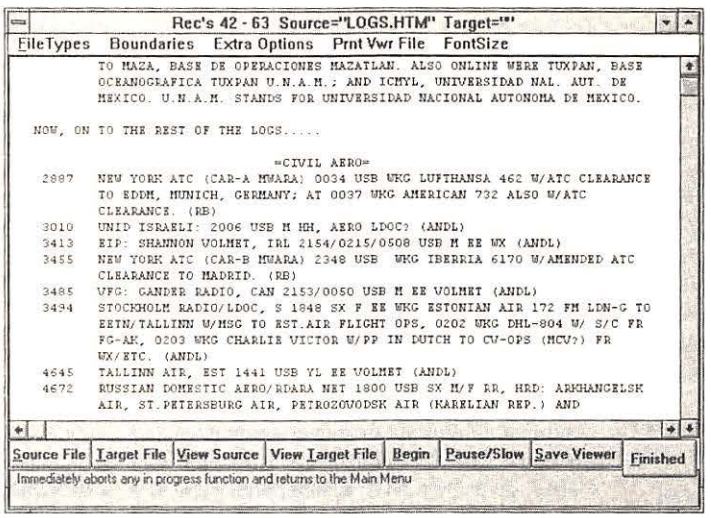
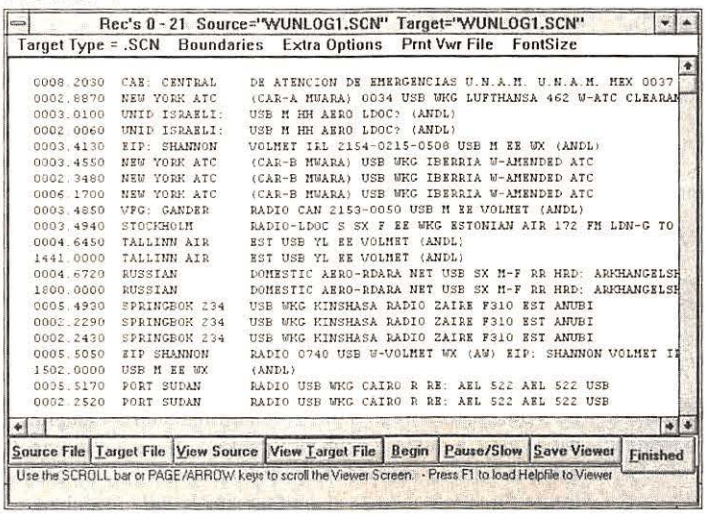


FIGURE 4



Bob Evans
revans@astral.magic.ca

Digital Resources Roundup

Welcome to another installment of Digital Digest. This month focuses on what's new in decoders, software, and digital utility resources on the the World Wide Web.

1. DACARS now handles biz jets

Written by Bart "Beaver" Hoekstra, DOS-based DACARS takes your .log files generated by the Lowe AirMaster and sorts through them, condensing them into easy to handle summary files that can be sorted by date/time, aircraft registration, or airline carrier code. Bart has just released a new version, which among other things, now also processes business jets. You can download a free demo copy from Bart's Web site in the Netherlands at:

Bart Beaver's ACARS Pages
http://www.euronet.nl/users/bart_b/

2. LABELADD - new ACARS utility

Written by Nick Birrel, LABELADD is a nifty utility that will put back the message labels onto logs captured with the Lowe Airmaster v. 3.0's "message label suppressed" option, so that you can use DACARS again! You have the best of both worlds here: a cleaner onscreen capture plus the ability to add message labels if you so desire. (Bart's program requires that message labels be present in the record for it to be processed by his program).

Lowe AirMaster 3 - Message Headers Displayed

```
ACARS mode: 2 Aircraft reg: .N601DL
Message label: 80 Block id: 5 Msg. no: 4748
Flight id: DL1908
Message content:-
3C01 POSWX 1908/20 KCVG/KBOS .N601DL
/POS JHW  /OVR 1549/ALT 370/FOB 0138/
SAT 53
/WND 349030/MCH 803/TRB LIGHT /SKY
SCATTERED ----------
----------[20/08/1996 11:46]
```

Lowe AirMaster 3 - Message Headers Suppressed

```
2 .N601DL 80 5 4748 DL1908
3C01 POSWX 1908/20 KCVG/KBOS
.N601DL/POS JHW /OVR 1549/ALT 370/FOB
0138/SAT 53/WND 349030/MCH 803/TRB
LIGHT /SKY SCATTERED ----------
----------[20/08/1996 11:46]
```

You can download a free copy of Nick's program from one of the following Web sites (worth a visit in any case):

Tony Orr's Northern Virginia HF/VHF ACARS
http://patriot.net/~jetset/
Bart Beaver's ACARS Pages
http://www.euronet.nl/users/bart_b/

3. The Naval Academy's Automatic Position Reporting System

APRS is a program developed by Bob Bruninga, WB4APR, to track mobile stations equipped with GPS navigation systems and to link those stations by radio. The Naval Academy uses APRS in a number of applications for data, communications, and telemetry. Live displays on their Web pages will show current APRS activity being monitored off the air in Annapolis, Maryland. (Your Browser must be JAVA capable and some of these pages will only be LIVE while there are unused PC's in the satellite lab.)

This screen shows the LIVE positions of commercial aircraft being monitored on the national ACARS frequency of 131.550 MHz. They are using a VHF scanner and a DSP-12 packet TNC for the ACARS decoding, and then converting those packets to APRS format for display. At the altitude of most aircraft, notice that they can hear out 200 miles in all directions.

The APRS Display of ACARS on 131.550 can be found at the following URL: **http://web.usna.navy.mil/~bruninga/acar.html**

4. What's New in Decoders

A. **HOKA Code3-Gold Update** now supports selectable alphabets. One of my criticisms in my October 96 review was that it did not support the Cyrillic alphabet when decoding former Soviet block maritime vessel traffic. Hoka has addressed this shortcoming, and has added a Select Alphabet option to the TOOLS Menu. The user now has a choice of International, US Mil, Scandinavian, 3-shift Greek, Cyrillic, Latin, 3-shift Cyrillic, 3-shift Latin, Hebrew (not included), and Amateur upper/lower case.

Choice number six (M19 3rd Shift Cyrillic) will display Cyrillic characters to the screen. Screen contents can be output to a file that preserves the alphabet. Unlike some decoders, the program will only print in Cyrillic when Cyrillic characters are being sent.

B. The Universal M-400, the first unit to provide ACARS decoding along with other HF/VHF modes, has been succeeded by the new **Universal M-450**. The original M-400 had a two-line, forty character LCD readout display and a parallel printer port. After printing over 10,000 pages of ACARS traffic in April of 93, I built a homebrew parallel to serial converter and routed the signal to the COM port of my computer. The M-450 is now equipped with a serial port as well and PC software is available to control its functions. A computer, though, is not necessary for the unit to function.

HF modes include: Baudot (RTTY), SITOR A and B, FEC-A, ASCII, SWED-ARQ, and FAX. VHF/UHF modes include: ACARS, GOLAY, POCSAG, DTMF, CTCSS, and DCS.

C. Universal's flagship decoder, the **M-8000,** has been upgraded to include GMDSS and POL-ARQ. In addition, the selective calling (selcal) capability and remote command set features have been enhanced. A new pass-all-packets setting has been added that displays both control and text packets.

5. Maritime selcal translation program

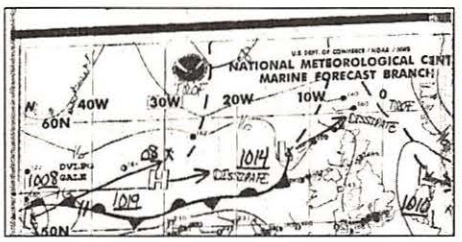
As most maritime monitors know, a mathematical algorithm is used to translate selective calling signals of the maritime mobile service (MMS) CCIR 476-3 SITOR radio teletype service between their numeric values and printable 4-letter-representations.

Ralf D. Kloth *<kloth@compuserve.com>* has now updated his SELCALL DOS program to version 1.5. The program is available for download at the following URL: **http://ourworld.compuserve.com/homepages/kloth/selcal15.zip**

The SELCALL ZIP-file contains EXE files for DOS and OS/2, TPU/TPO units, and a detailed DOC file. Version 1.5 has updated station names and selcals, reports the origin of an MMS coast station or ship station, and has enhanced program documentation.

■ 6. RADFAX for the Apple Macintosh

As any Mac user knows, there is very little in the way of radio software available for Mac systems. RadFax 0.9 is somewhat incomplete and may have bugs, but it is capable of receiving, displaying, and saving weather facsimile charts and photos via the sound input port of Macintosh computers. Basically you connect your Mac to a shortwave radio and tune in to weather fax station. You set the reception speed and desired resolution and start receiving. I simply hung the Mac microphone over the face of the NRD-535D's speaker. The NOAA weather chart below is one of my first catches.



Phasing the signal is tricky and you will often get a split image. The program can be found on many of the various Mac BBS sources or directly from Juri Munkki, Ehrensvärdintie 20B8, SF00150 Helsinki, Finland.

RadFax is available for a shareware payment of $25 and you will receive a disk from Juri with the full source code for the program. You will need at least Think C 5.0 and TCL to compile the program. If you are unable to locate a copy, e-mail me and I will send it to you, but don't forget to send Juri his shareware fee.

■ 7. In hurricane season, browse FEMA

The FEMA site at **http://www.fema.gov** is updated daily and sometimes hourly with news releases, situation reports, tracking maps, and graphics which offer hurricane preparedness information, fact sheets, and links to other sites with weather satellite images and forecasts.

In addition to the home page's simple set of key topic buttons, the site's recently upgraded search engine helps users find exactly the information they need.

1997 hurricane names for the Atlantic include: Ana, Bill, Claudette, Danny, Erika, Fabian, Grace, Henri, Isabel, Juan, Kate, Larry, Mindy, Nicholas, Odette, Peter, Rose, Same, Teresa, Victor, and Wanda.

■ 8. Aircraft tracking software demo available AirNav URL:

http://www.geocities.com/SiliconValley/Lakes/9420

■ 9. Other Web resources

The number one source for digital Ute information continues to be the WUN Web site with its daily subscription series and monthly newsletter. WUN is the Worldwide Ute News Club, a hobby club formed in January 1995 to promote the sharing of information about the shortwave utility hobby. WUN is not associated with any company or group (though hosted by the Grove server) and does not require dues. For further info see the club webpage at: **http://www.leonardo.net/berri/wun**

Stan Scalsky's latest incarnation of the Digital Signals FAQ, V5.0, is being released on the WUN pages. This release will include the latest on all the modes for wich we have data, new baud speeds, updated system parameters, new ACF section, continuing work on unidentified signals, new references/definitions, and the latest info on decoders. This tome features the most comprehensive technical presentation of digital topics available to the hobbyist.

■ 10. Globe Wireless - QSLing via the internet

Globe Wireless is a worldwide network — ten maritime utility stations promoting new and improved methods of HF radio communications. Globe has a Web site at **http://www.globewireless.com**

Michael Beck is (among his other duties) QSL manager for the network. Globe welcomes signal reports from Utility Monitors via either the post office (Globe Wireless, 1 Meyn Road, Half Moon Bay, CA 94037, attn: Michael Beck) or via the Internet at *qsl@globewireless.com*

Well, that wraps up another installment of *Digital Digest*. You can reach me via e-mail at *revans@astral.magic.ca* or via my Web pages at **http://www.magic.ca/~revans/radio.html**

GLOBE'S BROADCAST SCHEDULE

SITOR Traffic Lists:

A9M	Odd	H+35
KEJ	Even	H+15
KFS	Odd	H+25
SAB	Even	H+35
VCT	Odd	H+05
VIP	Even	H+45
WLC	Odd	H+55
WNU	Even	H+55
ZLA	Odd	H+45
ZSC	Even	H+25

WNU weather broadcast schedule:
Gulf/Caribbean/Atlantic tropical hurricane bulletins 0221 0521 0821 1121 1421 1721 2021 2321 UTC
Gulf/Caribbean offshore forecast 0351 0951 1551 2151 UTC
VCT weather broadcast schedule:
North Atlantic high seas weather 0451 1051 1651 2251 UTC
KFS weather broadcast schedule:
Eastern/Central Pacific tropical hurricane bulletins 0221 0521 0821 1121 1421 1721 2021 2321 UTC
Pacific high seas and offshore weather 0451 1051 1651 2251 UTC
ZSC broadcast schedule:
Weather 0930 1700 UTC
Navigational warnings 1000 1730 UTC

GLOBE WIRELESS STATION LOCATIONS

KFS	Palo Alto, California	USA
KEJ	Hawaii	USA
WLC	Rogers City, Michigan	USA
WNU	Slidell, Louisiana	USA
VCT	Tors Cove, Newfoundland	CANADA
SAB	Gothenburg	Sweden
ZLA	North Island	New Zealand
ZSC	Cape Town	South Africa
VIP	Perth	Australia
A9M		Bahrain

SITOR OPERATION FREQUENCIES

GLOBAL RADIO NETWORK CHANNELS - SELCAL 1094

Ch.	Ship	Shore	Station
201	2070.5	2137.5	WLC
228	2155.5	1620.5	SAB
401	4172.5	4210.5	WNU
402	4173	4211	ZLA
403	4173.5	4211.5	KFS
404	4174	4212	WLC
406	4175	4213	VIP
408	4176	4214	ZSC
10501	4154.5	4300.4	KEJ
10502	4157.5	4347	A9M
10503	4166.5	4259	SAB
602	6263.5	6315	ZLA
603	6264	6315.5	KFS
604	6264.5	6316	WLC
617	6271	6322	ZSC
625	6275	6326	KEJ
626	6275.5	6326.5	SAB
627	6281	6327	WNU
632	6283.5	6329.5	VCT
10901	8305.5	8541	A9M
802	8377	8417	ZLA
803	8377.5	8417.5	KFS
804	8378	8418	WLC
806	8379	8419	VIP
819	8385.5	8425.5	WNU
830	8391	8431	KEJ
831	8391.5	8431.5	ZSC
837	8394.5	8434.5	SAB
838	8395	8435	VCT
11301	12373.5	12668	A9M
1202	12477.5	12580	ZLA
1203	12478	12580.5	KFS
1206	12479.5	12582	VIP
1210	12481.5	12584	VIP
1219	12486	12588.5	WNU
1244	12498.5	12601	ZSC
1257	12505	12607.5	WNU
1263	12508	12610.5	VCT
1265	12509	12611.5	KEJ
1291	12522	12624	SAB
11701	16554.5	17066.5	A9M
1602	16684	16807.5	ZLA
1606	16686	16809.5	VIP
1619	16692.5	16816	ZSC
1647	16706.5	16829.5	KFS
1657	16711.5	16834.5	WNU
1673	16719.5	16842.5	KEJ
1676	16721	16844	VCT
1691	16728.5	16851.5	SAB
11850	18850.5	19726	A9M
1824	18882	19692.5	ZSC
2203	22285.5	22377.5	KFS

WHAT'S NEW?

PRODUCTS AND BOOKS OF INTEREST

by Larry Miller

Contributors: Doug DeMaw, Bob Grove

Killer Scanner of All Time?

It's billed as "The Hyper Grade Scanner for Listeners of All Levels." It may be the ultimate in a feature-packed handheld. From Alinco, the manufacturer of ham and other two-way gear comes one *very interesting* scanner.

The DJ-X10 is a triple conversion handheld scanner covering everything from 0.1 to 2000 MHz — less cellular in the US, of course. Reception is in AM, WFM, NFM, USB, LSB or CW.

Manufacturer literature is an obvious translation from Japanese and is not always clear. For example, "User-programmable band plan automatically changes mode and step as it scans" sounds as if mode is both user programmable and automatic.

Here's what we've been able to glean from initial literature. The formal unveiling was made at the Dayton Hamvention. First, the DJ-X10 has two switchable levels of use. The first is a beginner's mode, in which "first time users may ... get acquainted with operation without sacrificing the high-tech features. More experienced users would enjoy the customized high-level scanning under the expert mode."

There is a scope built into the DJ-X10. First introduced at Alinco in 1993, the Channel Scope is a visual spectrum display that lets you see the activity of 40 channels at a glance with user-selectable span. The scope also provides all-mode seek scanning, peak search, and more.

Get stuck using your DJ-X10? The scanner has a HELP message feature on screen.

No need for weird modifications to get more memory channels here. The DJ-X10 comes with 1,200 channels. These are sorted by 32 different groups or banks. There are 1,000 skip channels and an auto-memory write that lets the scanner automatically memorize active frequencies for later monitoring. The radio can turn itself on and off at preset times. There are low battery alarms, attenuator, varying lamp brightness modes, and specs that seem very impressive.

Thanks to John at Advanced Specialties Electronics in Lodi, New Jersey, (201-843-2067) for the first tip-off on the DJ-X10. Grove says the radio will be included in their catalog as soon as it receives FCC approval.

If DJ-X10 only tracked trunked systems, it might well be scanner heaven.

Hyper Dimensional Pocket Radio?

So small it could also warrant the "hyper" prefix, the Electro 5 Band Pocket Radio measures just 5" x 3" x 3/4". The tiny radio covers AM, FM, TV (audio) channels 2 through 13 and the weatherband.

Don't worry about selectivity or sensitivity specs here. Just shove in the two "AA" batteries (not included) and fire this baby up. The Electro 5 Band Pocket Radio comes with headphone jack, headphones, and a telescoping antenna.

The Electro 5 Band Pocket Radio is just $19.99, shipping included. You can order your own from Heartland, 800-229-2901. Ask for product number L5-4948.

If that one's not in stock, an almost identical product is the Sonnet pocket radio, for the same price. The only apparent difference is the omission of an earphone, though it has a jack for one. Ask for product number L4-4946.

Crystal Set Projects published

Few devices have retained their magical appeal over the past century like the crystal receiver, a simple assemblage of a half-dozen components which allows voices and music to be heard out of the air — no batteries required!

Crystal sets provided a comfortable and enjoyable starting point for radio enthusiasts; they are sure-fire "crowd pleasers" for the intellectually inquisitive, and a great introduction to the radio/electronics hobby for youngsters.

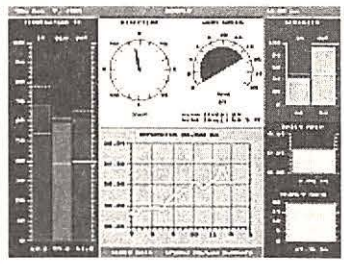
This new publication by The Xtal Set Society presents 15 crystal radio projects for beginners and experienced hobbyists alike. Remember the fun and wonder of hearing radio signals with a coil of wire, a capacitor, a mineral crystal, and an earphone? Would you like to do it again?

$14.95 plus shipping from Grove Enterprises, 800-438-8155.

— *BG*

WeatherLink 4

Davis Instruments is a company that builds a line of "home weather stations." No doubt you've seen their ads in this and many other publications. Aside from the very appealing idea of owning a home weather station that can tell you wind speed and direction, rainfall amount, temperature, and other vital data, Davis Instruments are computer-compatible.



Davis has just announced WeatherLink 4 for Windows. WeatherLink 4 automatically updates what are called "strip charts" — similar to National Oceanic and Atmospheric Administration "weather watcher" reports — that show weather trends. WeatherLink 4 also calculates and displays weather information not available on the station console.

One other thing you may not have known. Davis Weather stations are compatible with Automatic Packet Reporting System (APRS) software. APRS is mapping software that allows the user to send as well as receive weather data over packet and have it displayed on a regional map.

You can pick up a demo of the WeatherlLink software from the Davis website (**www.davisnet.com/software/**) and BBS (510-293-3546). A working copy of WeatherLink is $169, and runs with several models of Davis instruments. APRS is actually shareware and can be picked up at the same site.

If you'd like more information on WeatherLink 4 or on any Davis Instruments product, give them a call at 510-732-9229 or write them at 3465 Diablo Ave., Hayward, CA 94545. Mention *Monitoring Times* when you call.

Electronics CD ROM

Electronics 2000 is the name of a new CD ROM that promises "the ultimate collection of electronics software." There are over 5,000 files, all uncompressed and able to be run directly off the CD

ROM without being first transferred to the harddrive.

Here's a sampling of some of the programs on Electronics 2000: active filter design, circuit maker, IC book, Motorola database, PC components tester, Phillips components, and vacuum tube cross-reference.

The price for Electronics 2000 is $24.95 plus $5.00 shipping. You can order by phone at 941-953-8598, by e-mail at bytesize@bigfoot.com or by mail at Bytesize CD-ROM, 7350 S. Tamiami Tr., #91, Sarasota, FL 34231.

Build Your Own Transceiver

Whether you are interested in building an amateur transceiver from scratch, or simply want to know what all the circuits do inside the rig you have, *Build Your Own Intelligent Amateur Radio Transceiver* by Randy L. Henderson is written in an easy to follow style, presenting technical material in an understandable fashion.

The book is divided into chapters by transceiver function (audio, oscillators, etc.) and includes foil patterns for the PCBs. Complete schematics and functional block diagrams illustrate the work, with a nice list of parts vendors as an appendix. Several modifications are listed, and software codes as well as a discussion of program development tools are provided.

Several test equipment projects are also included in the book, such as a 6-74 MHz swept frequency generator and a 0-100 MHz spectrum analyzer. Quite a collection of useful design information for the hard-core radio enthusiast.

Soft cover $29.95, hardback $39.95, from McGraw Hill, 11 West 19th St., NY, NY 10011; phone 212-337-5951 for availability and shipping information.

— *BG*

Hyper Dimensional Resonator

Steven Gibbs of Clearwater, Nebraska, sells instruments which he says can be used for both "out of body time travel and in help healing the sick." The name of the unit is the Hyper Dimensional Resonator. We'll let Mr. Gibbs tell you about the HDR.

"This is a two-dial, one bank treatment instrument which plugs into a normal 110v outlet. This device generates an AC/DC, 60-cycle, alternating frequency which generates an unlimited amount of white light energy. This device comes equipped with a witness well, phenolic rubbing plate, multi-dimensional stabilizer, clear switch, power switch, time coils, and one electromagnet."

Besides healing the sick, the unit can also be used for time travel. "You can use the hyper-dimensional resonator for physical time travel," says Gibbs, "but only when activated over a natural grid point, or in a place where UFOs have been sighted."

The Hyper Dimensional Resonator with time coils, electromagnet, and instruction manual is $360. For more information, to order, or to request a catalog, you can call 402-893-3809. You can also write to Mr. Gibbs at R.R.1, Box 79, Clearwater, NE 68726.

In all fairness, Mr. Gibbs does offer a very up-front warning. "There is no warranty or guarantee on these units. [They] are only sold for experimental and research purposes. There is no money back guarantee." *Monitoring Times* offers an up-front warning, too: If you buy one of these, you're on your own.

The Conet Project

Numbers stations are found all over the shortwave spectrum. The transmissions, often synthesized-sounding voices reading long strings of numbers, have been going on since the early 1960s. There have been many theories as to their purpose and origin and most predicted their demise with the close of the Cold War. But the numbers stations keep transmitting their tantalizing messages into the ether... from someone to who-knows-whom.

A British company called Irdial-Disks has produced a special quadruple CD covering 25 years of numbers station activity, with detailed logs, essays, and a definitive lookup table of all known numbers stations, including Morse numbers stations. Also on the CD is some very rare recordings from as early as 1971 as well as current numbers station transmissions.

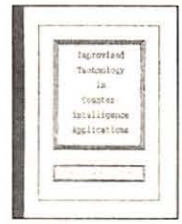
To get your copy of The Conet Project: Recordings of Shortwave Numbers Stations call 44+171+587+5349 or write THESE Records at 112 Brook Drive, London SE11 4TQ UK. The price of the 4-CD set is £27.50 plus £3.00 postage and handling in the US. Visa and Mastercard are accepted. Mention *MT* when you call.

Visit the Irdial website (**www.ibmpcug.co.uk/~irdial/conet.htm**) for more info.

Counterintelligence Technology

Improvised Technology in Counterintelligence Applications by Robert Ing sounds like a cumbersome title, but don't let it intimidate you; this 77 page, soft cover book is very easy to read. If you are interested in how a simple "sweep" for radio transmitting "bugs" can be performed, using home made accessories in conjunction with a scanner, Ing's book provides just that. It won't let you find every kind of bug, but its techniques will allow you, with some practice, to find the more common hidden transmitters.

Ing does not intend for his book to be a guide for professionals; it is far from that. Some procedures are oversimplified, and some projects may promise more than they can deliver, but it does provide interesting insight into the world of electronic espionage and counterintelligence.



$29.95 plus $3 shipping from Tiare Publications, PO Box 493, Lake Geneva, WI 53147; 800-420-0579.

— *BG*

Microwave Cooking

If I gave you a microwave transmitter, turned it on, and told you to press it against your head and hold it there, you'd look at me like I was crazy. Yet every day, millions of people do just that when they use their cellular phones.

Sure, the cellular telephone industry routinely dismisses studies showing links between cell phone use and brain cancer, but after seeing those congressional hearings on scanners, would you really want to trust your health to the cellular telephone industry? Magellan's is offering what they say is a cellular telephone microwave radiation shield.

Called PhoneShield, it is a specially designed radiation screen that "dramatically reduces the radiation directed at your head by reflecting it away." PhoneShield attaches with velcro and, according to the manufacturer, does not reduce the range of your phone. There

are three styles of PhoneShield; call Magellan's at 800-962-4943 for the one that fits your model phone. The price is just $29.85.

If not for the PhoneShield, call for Magellan's catalog; this mail-order company out of Santa Barbara, CA, carries all kinds of nifty gadgets for world travelers who encounter problems ranging from mosquito protection in the tundra to electrical and telephone adaptors for high-tech connections. Tell the folks, *MT* sent you.

Hunting for Treasure

Many of us radio hobbyists have metal detectors, and all of us who have are sure that some day...

John Castle's book *Hunting for Treasure* will turn skeptics into believers. His introduction, replete with a delightful photo of a pile of coins and jewelry large enough to make your mouth water, is followed by chapter two, entitled, *Success Stories*.

And successful they are. If you are an impressionable beginner, don't read this chapter unless you are ready to abandon your family and job and head for beaches, historic sites, old schoolyards, abandoned homesteads, and other romantic locations just waiting for you and your detector.

A British publication with definite British references, the chapters nonetheless could be American; treasure is treasure, metal detectors are designed and operated the same way here and there, and Castle does a fine job of telling us all about them in his 92 pages. It has rekindled my enthusiasm; I think it's time to warm up my Fisher CZ-6; the weather forecast says the weekend is going to be pleasant, and...

$17.00 plus $2 shipping and handling from Fisher Research Laboratory, Dept. MT, 200 W. Willmott Rd., Los Banos, CA 93635.

— *BG*

Introducing QRP

The growing popularity of low power (QRP) operation has spawned another book on this subject. The latest entry comes from the United Kingdom. *Introducing QRP* is the first book of its kind to originate in England. It is written by well known QRPer Dick Pascoe, G0BPS, who operates Kanga Products in the U.K. Dick's theme is an introduction to the history and skills of low-power operating in the United Kingdom. He stresses that "power is no substitute for operating skill." As low power operating in the U.K. is no different than elswehere in the world, the book should appeal to QRPers worldwide.

There are 10 chapters in the book. Representative examples are, What is QRP?, Typical QRP Equipment, Operating Skills and Construction Techniques, and Computers in the Shack. Two appendices treat the Q codes in use today and QRP clubs around the world.

The author takes the neophyte by the hand and walks him or her through the subject of QRP. Experienced QRPers should find the book a delightful reading experience for obtaining the Brits' slant on low-power operation.

There is a discussion of modest but effective antennas for QRP operation. A simple, practical receiver is described (The Sudden Receiver). It uses two ICs for the complete circuit. Two inexpensive, easy-to-build CW transmitters (The OXO and ONER) are detailed in the book. These

projects can be built and made operational by almost any beginner, irrespective of his or her previous workbench experience.

Are you fed up with the clatter and din of high-power DX pileups, on-the-air rudeness and the high cost of commercial amateur equipment? If so, this book can guide you to a less stressful life of easy-going, low-cost CW operation. QRPers are, as observed during my many years of low-power operation, ladies and gentlemen. *Introducing QRP* could be your stepping stone to new adventure.

There are 74 pages of information in this soft-cover booklet, which may be purchased in the USA from Bill Kelsey, N8ET, 3521 Spring Lake Dr., Findlay, OH 45840. E-mail to *Kanga@mail.bright.net*. The author may be reached at *dick@kanga.demon.co.uk*. Book price: $10, plus $3 shipping.

— DD

Tighter Customs?

One way that people have sidestepped the ban on cellular-capable scanners is to order their scanners from outside the United States. The prices are a little higher, but you can get models by mail-order that you can't get in this country. Technically, though, these radios are not supposed to get through customs.

For years, this was no problem. Recently, however, we have received at least two reports that scanners shipped to the U.S. from the British firm, Javiation, have been seized by customs in Chicago. At this time, it is not known whether the government allows any recourse, but it is known that Javiation does not guarantee receipt of the scanner.

A second firm, Atlantic Ham Radio of Canada, has not reported any seizures but does guarantee to hold the customer harmeless if a radio he or she has ordered gets seized by the U.S. government.

It is not known whether these are isolated incidents or indications of a stepped-up government crackdown on cellular-capable scanners. Rumors range from reporting four seizures to claiming that legal scanner imports are also being held. All seizures seem to revolve around Chicago Customs. The *MT* editor welcomes your reports of substantiated cases and how they were resolved; send to *MT*'s post office address or to *mteditor@grove.net*.

Catalogs You'll Want

Here are two catalogs you may want to check out. First is Tiare Publication's 1997 book catalog. Its 20 pages and crammed with nothing but radio titles, ranging from scanner and shortwave to ham. You're going to need to send along a dollar for this one to help out with postage. The address is P.O. Box 493, Lake Geneva, WI 53147.

Another interesting catalog is from the How-To-Do-It book shop. There are lots of radio, electronics, and technology titles here, but some of the most intriguing have titles like *How to Toilet Train Your Cat, Roadkill Cookbook* and my favorite, *To Hell With Positive Thinking*. All you have to do to get this catalog is call owner Bob Wiley toll-free at 888-836-4822. Mention *MT* when you call for either of these catalogs.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902 Press releases may be faxed to 704-837-2216 or e-mailed to mteditor@grove.net.

Lawrence Magne
Editor-in-Chief, Passport to World Band Radio

Icom Strikes Back with the IC-R8500

Break out the toasting glasses—Icom is back in the game! And back with a wide-coverage receiver that may have at least some aficionados fingering their wallets, and wondering if their credit cards can stand the heat.

The new Icom IC-R8500 covers 0.1-1999.99 MHz (minus the 824-849 and 869-894 MHz *verboten* cellular gaps) in the AM, SSB, CW, FM, and wide-FM modes. So it delivers not only world band coverage, but also all kinds of juicy catches that can pop up above 30 Megahertz. In this review, we'll mainly weigh its potential for shortwave listening.

The R8500 lands at an interesting, if rarified, spot on the price/performance curve. At a bit less than two kilobucks, the '8500 is a few hundred more than the highly rated Japan Radio NRD-535D, about two grand less than the "El Supremo" Watkins-Johnson HF-1000, and four thousand dollars under the only other receiver with comparable coverage, Icom's own IC-R9000—which is no longer available to the American public, as its coverage includes cellular frequencies.

So for the "I want it all in one box" enthusiast who is convinced that four figures isn't too much to pay for a radio, the '8500 offers interesting possibilities.

Almost no other receiver is made like this, except some battle-ready military gear going for tens of thousands of dollars. The '8500's construction puts to shame virtually every other world band tabletop receiver on the market today.

Beefy and tough!

If there is a single distinguishing characteristic of the '8500, it is physical ruggedness. Slip off its covering, and underneath is revealed a Schwarzenegger-tough cast-aluminum chassis with computer-like board layout. Also used are zero-insertion-force connectors, along with computer ribbon cables for interconnects.

Also helping assure long-term reliability is that the '8500, unlike its older '9000 cousin, runs cool.

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Loaded with (many) goodies

The '8500 is laden with many of the features that beady-eyed DXers look for in a top-gun rig. In addition to a variety of modes and wide frequency coverage, the '8500 drips with juicy offerings: three voice bandwidths, plus another for CW; IF shift; audio peak filter; adjustable BFO (+/- 1200 Hz); tuning steps that are instantly adjustable from 10 Hz to 1 MHz (with eight other possibilities between); your own programmable tuning step; 1000 presets (memory channels) organized in 20 banks of 40 channels; 100 skip channels; 100 auto-write presets (memories); both memory banks and memory channels that can be named; noise blanker; three antenna connectors; a robust tilt bail for elevating the receiver; three stages of attenuation; RS-232 port for computer control; various scanning capabilities; clock-timer; record jack; and recorder activation jack.

There are two (fast and slow) AGC decay choices, and in practice they appear to be adequate. However, the AGC cannot be switched off. The AGC thus meets only minimum expectations for a receiver in the $1,000-and-up price class.

Despite all this, some of the features that dedicated DXers and program listeners have come to expect in a modern tabletop receiver are completely missing: no notch filter and no synchronous selectable sideband—not even everyday double-sideband synchronous detection. And, astonishingly, the IF shift does not work in the AM mode.

Partially compensating for the lack of a tunable notch filter is a two-position audio filter which can be adjusted to shape the audio. This works pretty well, but doesn't replace a properly designed tunable notch filter.

Disappointingly, the '8500 is powered by an outboard AC converter. This may be appropriate to a plastic portable or Makita drill, but certainly not a pricey communications receiver.

Clean layout, functional ergonomics

With so much front panel real estate to work with, Icom's designers have been able to get some important ergonomics ducks in a row. For example, all controls and buttons are commendably large, with only two sets being concentric; labels are easy to read; and everything is well spaced.

To write to a memory channel, you select the memory bank and memory channel you want, enter the frequency, then press the MW button. That's it—you're done, although you can also store the tuning step and some other parameters. Every memory is tunable, so you can punch up a new frequency at any time without disturbing the contents of the memory unless you intentionally overwrite it. To choose a preset, simply select the memory bank, then use the keypad or memory selector knob to bring up the preset you want.

Considering the huge number of memories that are available, this arrangement is reason-

ably straightforward.

One ergonomics compromise

Still, Icom made a significant ergonomic compromise with the '8500: The bandwidths are set up on an unhandy carousel, being accessed only by repeated button-pushing.

Making matters worse, there is no indication of which bandwidth is in use. If you want to divine this, you have to poke the carousel button and go through the whole ring-around-the-rosie again.

Generally worthy performance

In almost every measurement of receiver performance, the '8500 earns excellent-to-superb ratings in our lab tests. Sensitivity at world band frequencies is among the highest we have ever encountered, helping make the '8500 exceptionally appropriate for serious DXing. The noise blanker works as it should, too, and spurious signals are few and unobtrusive—more DXing pluses.

Our lab tests also confirm what your ears will hear and appreciate: The '8500 is, in many respects, well-suited to long-term listening. Distortion in the AM mode is generally low, and in the single-sideband mode distortion is so minimal as to be almost unmeasurable. In all, audio quality below 30 MHz is reasonably good, but with proper AM-mode bandwidths (see below) would be much better. However, a good outboard speaker is virtually necessary, as the built-in speaker is pedestrian.

There is also an unexpected drawback for VHF listening. Wideband FM signals, such as FM broadcasts and TV audio, come through with a substantial level of hiss not found on the sibling Icom IC-R9000.

There are other problems. The '8500's dynamic range is poor at 5 kHz spacing, making this receiver potentially inappropriate for flushing out faint world band stations in frequency proximity to powerhouse signals. As a practical matter, North American DXers, especially if they're west of the East Coast, probably won't notice this. But in some other parts of a world this could be a real problem.

Of broader interest is that the AM-wide bandwidth, at a whopping 13.7 kHz, is too broad for virtually anything other than listening to the clearest of local AM-band signals. As to the AM-medium bandwidth, nominally 5.5 kHz, it actually measures 7.1 kHz—far too wide for listening to most world band signals. The AM-narrow bandwidth, which measures 2.7 kHz, is excellent for reception of signals caught in a sea of congestion, but at the cost of muffling the audio.

This receiver desperately needs a fourth voice bandwidth in the vicinity of 4 kHz to 5 kHz. The only practical solution is to remove the virtually useless stock AM-wide filter. Once this is done, the AM-medium filter can be placed into the AM-wide socket, then a high-quality filter of roughly 4.5 kHz can be installed as the new AM-medium.

The single-sideband bandwidth, nominally 2.2 kHz, actually measures 2.7 kHz. This is fine for listening to utility signals, as well as world band and AM-band signals carefully tuned in as so-called "manually tuned exalted carrier selectable sideband."But this bandwidth is too broad for crowded ham radio communications. At this price, there is no excuse not to have a second, narrower, single-sideband bandwidth.

How does the '8500 compare to the costlier Icom IC-R9000? In *Passport*'s A-B tests against an R9000, the '9000 came off as the clear winner both in performance and features. In the new political climate of the Nineties, the airwaves no longer belong to the public, so radios such as the '9000 which can receive "forbidden"frequencies are outlawed from sale except to official organizations of the government and designated private organizations. However, the '9000 and other outlawed receivers can be obtained (like bootleg whisky during Prohibition and generally at your own risk), from our sensible neighbors in Canada.

With its tank-tough construction and other admirable qualities, Icom's IC-R8500 should be a five-star radio. But because it lacks synchronous selectable sideband, a proper complement of bandwidths and worthy dynamic range, among other shortcomings, it earns just four stars.

This equipment review is performed independently by Lawrence Magne and his colleagues in accordance with the policies and procedures of International Broadcasting Services, Ltd. It is completely independent of the policies and procedures of Grove Enterprises, Inc., its advertisers and affiliated organizations.

Icom R8500 is $1899.95, free shipping from Grove Enterprises.

Bob Parnass, AJ9S

Uniden Bearcat BC235XLT Portable Trunk Tracker Scanner

Uniden has broken new ground with the 300 channel BC235XLT portable scanner, the first consumer grade receiver which can selectively follow conversations in 800 MHz Motorola trunked radio systems.

Despite the similar physical appearance, the BC235XLT incorporates several improvements over non-trunking BC230XLT, reviewed in April 1996 *MT*. The BC235XLT sports 300 channels in 10 banks versus the BC230XLT's 200 channels. Each model is furnished with the same wall wart power supply plus a CRX120 auxiliary charging tray.

The new BC235XLT is sold with two BP-180 800 mAH NiCd battery packs, versus two BP-120 600 mAH packs furnished with our BC230XLT. That's a 33% battery capacity increase, though our BC235XLT consumes 20% more current while scanning conventional signals.

Familiar Features

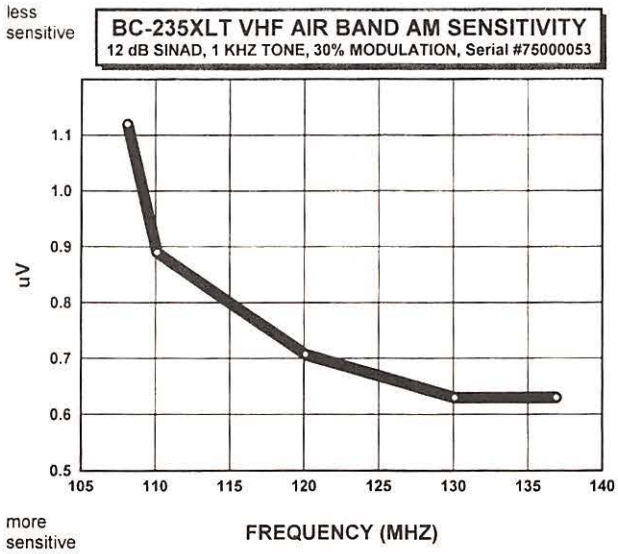
The Philippine made BC235XLT operates much like the BC230XLT and other mid-line Bearcat models when used to monitor conventional systems. Its 300 channels are allocated among 10 banks and a short rescan delay may be programmed on a per channel basis. A query feature identifies duplicate memory channels.

Various combinations of banks may be scanned and our BC235XLT scans a mixture of frequencies at 64 channels/sec, almost twice the speed of the BC230XLT we tested. Memory scan wastes no time scanning empty channels. Individual channels can be locked out from memory scanning, and a simple keystroke sequence unlocks all locked channels in a bank.

One channel in each bank can be designated a priority channel and is sampled every 2 seconds. A single pair of frequency limits can be programmed for searching up or down, but searching and priority cannot be used simultaneously. Up to 20 frequencies may be locked out from a limit search.

Factory preprogrammed frequencies for police, fire/emergency, commercial air, marine, and weather can be scanned by pressing the SVC key. Oddly, our county sheriff's dispatch frequency, 460.525 MHz, is included in the Fire/Emergency category but not in Police. The display alternately flashes the marine channel number and frequency when paused during a marine service scan — a handy convenience. Up to 20 frequencies can be skipped during a service scan, except weather frequencies.

AM and NFM emission modes are selected automatically depending on the frequency and cannot be overridden. Data Skip jumps over unmodulated and constant tone or data signals if they are strong enough. It works more effectively than the Data Skip in the BC230XLT we tested, though it is disabled when scanning AM aircraft or using priority scan.



Trunk Tracking

The BC235XLT is designed to follow conversations in Motorola Type I, Type II, Type IIi, Hybrid, SMARTNET, and PRIVACY PLUS 800 MHz analog trunk systems. It will not track GE (Ericsson), E. F. Johnson, 400 MHz, or 900 MHz trunked systems, which must be scanned in the conventional mode. The BC235XLT defaults to Motorola Type II systems, which divide a large number of users into several groups, called talk groups. We easily programmed two public safety Type II trunked systems by entering their frequencies.

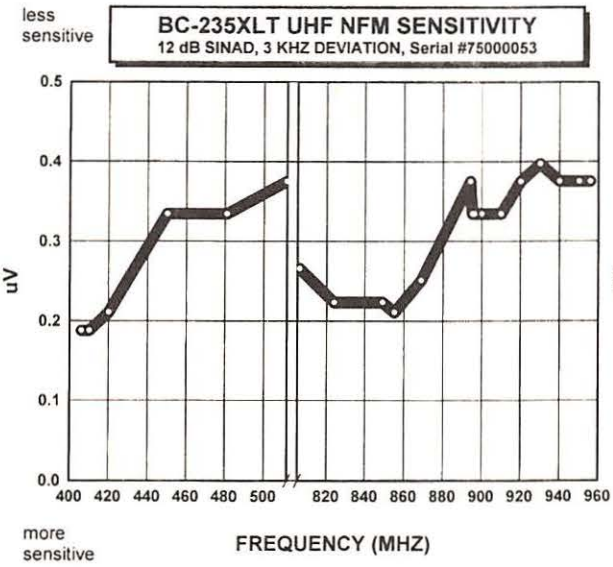
The older Type I systems organize users into fleets and subfleets. Programming a Type I or IIi system is more complicated because it requires entering something called a "Fleet Map."

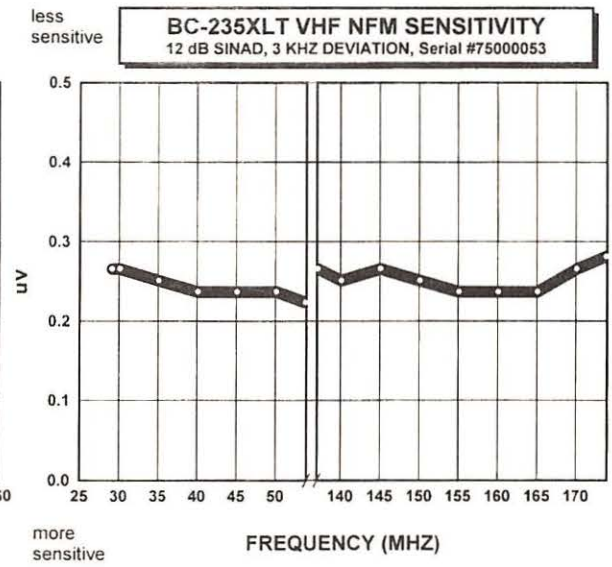
There's no easy way to determine *apriori* the proper

TABLE 1: Measurements, UNIDEN BC-235XLT S/N 75000053

Frequency coverage (MHz):
29 - 54 (5 kHz steps)
108 - 137 (AM, 12.5 kHz steps)
137 - 174 (5 kHz steps)
406 - 512 (12.5 kHz steps)
806 -823.9875, 849.0125 - 868.9875, 894.0125 - 956 (12.5 kHz steps)
Sensitivity: see graphs
FM modulation acceptance: 13 kHz
Image rejection:
58 dB at 155 MHz
62 dB at 858 MHz
Audio output power, measured at earphone jack:
135 mW @ 10% distortion
Practical memory scan speed: 64 channels/sec.
Scan/search speed, Turbo: 300 steps/sec.
Scan/search speed, regular: 93 steps/sec.
Current consumption at 4.8 VDC:
off - 0 mA
manual - 84 mA
scan - 84 mA
trunk scan - 88 mA
full volume - 150 mA
Battery saver: after 60 seconds in Manual mode.
Low battery warning at 4.5 VDC or less.
Shutdown at 4.3 VDC or less.
Intermediate Frequencies:
254.4, 10.85, and 0.450 MHz

Fleet Map unless someone tells you. You can try each of BC235XLT's 16 preset Fleet Maps or enter a custom Fleet Map through the keypad. Finding the right Fleet Map can be a long, trial-and-error process. You have to try each Fleet Map, one at a time, listen to the trunked system, and try to determine if the BC235XLT is tracking the fleets properly. If not, you must go on to the next Fleet Map.





We programmed 16 frequencies for a local SMR (specialized mobile radio) business trunked system and our scanner identified the data channel. We tried several Fleet Maps before running out of patience and settled for testing our BC235XLT with Type II systems instead.

The BC235XLT skips over telephone calls and conversations on talk groups designated as private. Our BC235XLT also skipped over DVP scrambled transmissions, though we could hear a brief noise burst at the start of transmissions.

Each of the BC235XLT's 10 banks can be programmed with the frequencies for a single trunked system or with frequencies for conventional use, but you cannot follow trunked conversations and scan conventional systems at the same time. A Trunk key selects between trunking and conventional operation.

When using the BC235XLT for trunk tracking, you must think in terms of talk groups or fleets instead of thinking about frequencies. Talk group and fleet numbers, not frequencies, are displayed while searching or scanning in the trunked domain. Fortunately, Uniden designed the BC235XLT's delay, hold, and lockout facilities so operation is very similar in both trunk and conventional domains.

You can search or scan for active talk groups in the trunked domain and lock out up to 100 uninteresting talk groups. You can program up to five lists per bank with talk group numbers for scanning. See the March 1997 cover feature for a more detailed description of BC235XLT trunk tracking features.

Improved Image Rejection and Few Birdies

We only detected 10.85 and 0.450 MHz IFs (intermediate frequencies) in the BC235XLT (versus 10.80 and 0.450 MHz in the BC230XLT). We measured for images based on these two IFs, and the Trunk Tracker's image rejection is much improved. Cellular phone image rejection was measured at over 62 dB in the 800 MHz range versus 0 dB in our BC230XLT! VHF-high band images are attenuated by 58 dB at 155.5 MHz versus only 17.5 dB in our BC230XLT.

After testing was completed, we were informed by Uniden that the BC235XLT has a first IF of 254.4—similar to other Uniden models; good shielding and isolation apparently prevented it from showing up on the spectrum analyzer.

We found relatively few birdies in our BC235XLT. There were no birdies in the VHF-high or air band, and we found only five birdies between 861 and 956 MHz. Harmonics of the crystal controlled 10.4 MHz local oscillator were responsible for birdies at 31.2, 41.6, and 52 MHz. Finally, there were birdies at 9.9 or 9.125 MHz intervals between 406.2 and 507.25 MHz.

Other Performance Characteristics

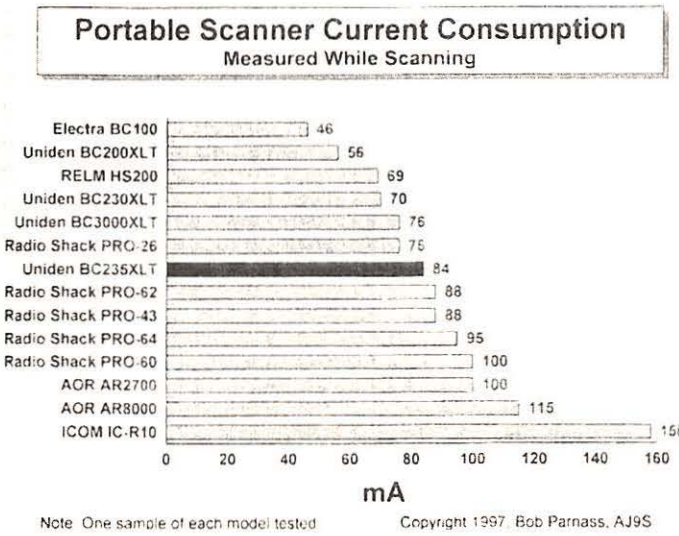
Audio output was crisp, though distortion was noticeable with the volume control cranked to extreme. Stereo or monaural headphones can be connected through a 1/8" jack on top and audio is heard from both sides.

We listened for, but heard no intermod while using the BC235XLT both mobile and while connected to a base station antenna.

Summary

Our BC235XLT worked as advertised, allowing us to navigate Type II trunked radio systems for signals of interest while skipping over less interesting talk groups. We could not verify older Type I trunk operation due to the complexity of finding the proper Fleet Map.

The BC235XLT is not merely a BC230XLT plus trunk tracking. Apart from its trunking capabilities, our BC235XLT exhibited a very fast scan rate and excellent image rejection and intermod immunity.



Clem Small, KR6A

Where's the Ground in a Groundplane?

Because both the quarterwave groundplane antenna (fig. 1A) and the Marconi grounded quarterwave antenna (fig. 1B) each have a quarter-wavelength vertical element and a set of radials below that element, it is easy to mistakenly assume that they are simply two different variants on one design.

As the vertical element of a Marconi grounded quarterwave antenna receives a signal from the space around it, this causes an electric field to exist between the vertical element and the ground immediately surrounding the antenna. Radials (elements which extend out from the base of the antenna as spokes extend out from a wheel) are buried in the ground around the antenna. They collect current from this field and allow it to flow back to the vertical element. Because the radial wires have much less resistance than does the ground in which they are buried, they allow more current from the signal to flow in the antenna, and on to your receiver, than would the ground alone. This increased current flow can lead to improved reception in areas where received noise is low (see below), but it is even more important for efficient radiation in transmitting.

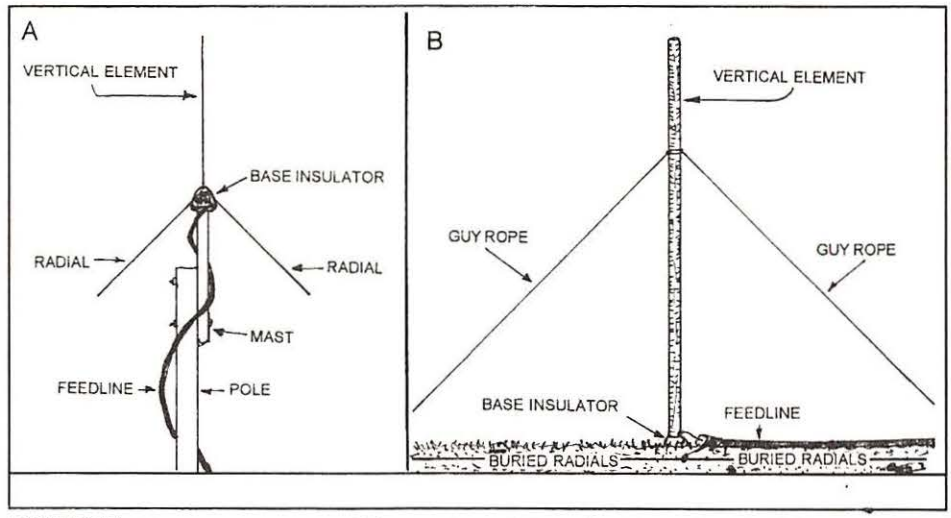


FIGURE 1. *A quarterwave groundplane antenna (A), and a Marconi grounded quarterwave vertical antenna (B). See text for details.*

Whereas the radials are buried collectors of energy in the Marconi, in a groundplane antenna the radials are actually part of the resonant circuit of the antenna. The groundplane antenna's radials are clear of the ground, and actually receive and transmit signals just as the vertical element does during reception or transmission. (See this month's Radio Riddle for more on this.)

Because its radials are buried, the Marconi antenna must be located on the surface of the earth. The groundplane antenna, with its radials free of the earth, can be located above the earth on buildings or towers. This is a great advantage for VHF-UHF work where increased antenna height often dramatically increases range of communication. On the VHF-UHF bands the groundplane antenna is relatively small, and can be easily mounted high in the air. We see many of them in use on these bands.

On the HF and MF bands antenna element size is considerably greater than on VHF-UHF. This increase in element size makes it difficult to construct and mount HF-MF groundplane antennas where the radials can be sufficiently high in the air to avoid undesired interaction with the ground. For this reason the Marconi grounded vertical is more popular than the groundplane antenna on these lower frequency bands.

Lately, it has become popular to use elevated (non-buried) radials for quarterwave-vertical, ground-mounted antennas on the HF and MF bands. Good results are being obtained with only a few elevated radials as compared to the many buried radials formerly recommended.

Yes, But What Are They Good For?

Vertical antennas such as those discussed above have long had a reputation for giving generous amounts of low-angle radiation and reception capability. For the HF bands low-angle patterning means good long-haul DX work. For VHF-UHF and microwave work low-angle patterning is also desirable because it spreads the antenna's radiation and reception pattern (RRP) down into the geography around you rather than up into the sky where it is less useful.

Let's Make a Vertical Antenna!

1. For either type antenna make the vertical element a quarter wavelength long using one of the formulas below:

Length (feet) = 234/frequency(MHz)

For example, at 10 MHz the length is 234/10 or 23.4 feet or,

Length (meters) = 71.3/frequency(MHz)

2. Make the radials for the groundplane antenna the same length as the vertical element. For the groundplane two radials are actually enough, although many writers recommend three or four.

For the Marconi the buried radials can be any length; a quarterwave is good, but if you can't make them that length make them as long as you can. For Marconi antennas used to transmit, the more radials — up to 120 or so — the better.

For a receive-only HF or MF grounded Marconi you can get by with only a few radials. This is because, at these frequencies, the signal-to-noise ratio, not signal strength, determines quality of reception. Bury radials no more than a few inches in the earth.

For buried radials any wire is okay. For groundplane radials wire or tubing is good. Larger diameter elements give greater bandwidth to the antenna.

3. For either antenna insulate the vertical element from the radials. Connect the center connector of a coaxial feedline to the bottom of the vertical element, and the coax shield to

the radials as they converge at the antenna's base.

50-ohm coax gives a reasonable match (SWR=1.4) on either antenna. If the groundplane's radials are drooped about 45 degrees downward, that antenna closely matches 50-ohm coax. Solder the connections if possible, and seal the coax with coax sealant.

4. Depending on the size of your antenna you may want to use a block of plastic or a PVC plumbing connector as a base insulator between the vertical elements and the radials. For larger grounded verticals, the vertical element may rest on an insulator and be held in place by guy ropes.

If you use wires as guys, break them up with insulators so that no wire in the guy is a half wavelength, or multiples thereof at the operating frequency of the antenna. Smaller antennas can be made self-supporting with the use of tubing for elements.

5. Mount groundplane antennas as high as practical.

6. As with any outdoor antenna, the minimum lightning-induced damage protection is to never use the antenna during bad weather, and to disconnect and ground the antenna when it is not in use.

RADIO RIDDLES

Last Month:

I mentioned the effect of antenna resonance on antenna radiation patterning and asked, " What is that effect? "

Let's discuss resonance in a typical halfwave dipole mounted a modest distance above ground. The radiation-reception pattern for a dipole is close to the shape of dome or half sphere with its flat side on the ground. It will have a couple of nulls (areas of decreased radiation or receptivity) off the ends of the antenna.

Shortening a resonant dipole raises its resonant frequency above the operating frequency (i.e., it is no longer a resonant antenna for the operating frequency). Nevertheless, the antenna's RRP remains essentially as when the antenna was at the desired resonance point.

If we make the antenna longer, this lowers its resonant frequency. As the antenna becomes significantly longer the antenna's RRP will be significantly modified. Specifically, lobes (areas of increased radiation or receptivity) and nulls begin to form in the antenna's RRP at considerably increased lengths.

The RRPs of many different antenna designs change in response to shifts in resonant frequency away from the operating frequency. As the antenna design gets more complex I'm sure the changes are more complex also, but I know of no general rule to predict what they will be.

This Month:

The groundplane antenna has a quarterwave vertical element and two or more quarterwave radials. As you know, the radials extend outward symmetrically from the base of the vertical element as spokes extend from the hub of a wheel. When this antenna is transmitting what does the radiation from the radials contribute to the signal strength as received by a distant receiving antenna?

Hint: remember the canceling effect of currents which flow in opposite directions within the same wire.

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.

SPECIAL EVENT CALENDAR

July 4	Dillsburg, PA	Harrisburg RAC / Firecracker Hamfest / Tom Hale, WU3X, 717-232-6087 / Location: Monagahan Fire Hall, 245 W. Siddonsburg Rd, Dillsburg, PA (near Harrisburg). Talk in W3UU 146.16/76. 8am, admission $4.
July 5	Salisbury, NC	North Carolina Alligators Group / Walter Bastow, N4KVF, 704-279-3391
July 6	Livermore, CA	Livermore ARK / Noel Anklam, KC6QZK, 510-447-3857
July 6	Lisbon, OH	Triangle ARC / Dick Sisley, K8JKB, 330-385-1245
July 6	Wilkes-Barre, PA	Murgas ARC / Robert Michael, WB3FAA, 717-288-3532
July 9	Iowa City, IA	Iowa City ARC / Jon Poulton, W0CK, 319-354-1735
July 12	P.E.I., Canada	Summerside ARC / Lloyd Cannon, VY2CQ, 902-436-9078
July 12	Glenwood Springs, CO	Ski Country ARC / Swap, pot luck, fox hunt / Chuck Kimball, N0NHJ, 970-945-6778 / Location: Two Rivers Park in Glenwood Springs. Talk in 146.800- (107.2Hz). 10am / http://www.geocities.com/CapeCanaveral/7466/2rivers.htm
July 12	Petoskey, MI	Straits Area ARC / Jim, KC8FFS, 616-537-2422
July 12	Spruce Pine, NC	Mayland ARC / Byrne Tinney, KT4CA, 704-688-3942
July 12	Altus, OK	Altus Area ARA / Ron Hughes, KB5UVC, 405-482-7994
July 12	Texas City, TX	Tideland ARS / Garth Crowe, N7XKT, E-mail: flamejumper@sat.net
July 12	Eau Claire, WI	Eau Claire ARC / Carol Ceraso, N9TUA, 715-723-9205
July 12	Oak Creek, WI	S Milwaukee ARC Swapfest / Robert Kastelic, WB9TIK, 414-762-3235 / Location: American Legion Post #434 grounds, 9327 S. Shepard Ave. Talk-in 146.52 simplex. 7am to 2pm, adm $5
July 12-13	Indianapolis, IN	Central Division Convention / Rick Ogan, N9LRR, 317-257-4050
July 13	Sugar Grove, IL	Fox River Radio League / Diana Skube, WD9API, 630-293-7485
July 13	Alexander, NY	Genesee Radio Amateurs / Don Partis, WA2AIV, 716-343-4484
July 13	Bowling Green, OH	Wood County ARC / Larry Reitz, WA8CWD, 419-837-2202
July 13	Kimberton, PA	Mid-Atlantic ARC / Bob Haase, W3SA, 610-293-1919
July 13	Pittsburgh, PA	North Hills ARC / Bob Ferrey Jr., N3DOK, 412-367-2393
July 17-18	Asheville, NC	Disaster Emergency Response Assoc Regional Workshop / P.O. Box 6558, Asheville, NC 28816 / Location: Laurel Auditorium, Asheville-Buncombe Community College / Write for complete info, and visit www.netcom.com/~n3dak/asheville.html
July 18-20	East Glacier, MT	Montana State Convention / Edith Van Schaick, VE6EDY, 403-293-8920
July 19-20	Stratford, NY	Special Event Station W2ZZJ to commemorate the 171st anniversary of the birth of Dr. Loomis, the American radio pioneer, born at Oppenheim, NY July 21, 1826. Operation from 1300-2000Z on most bands. / Send QSL, contact #, and a #10 SASE ($.55) to: W2ZZJ, 5738 STHWY 29A, Stratford, NY 13470.
July 19	Leesville, LA	West Central ARC / Jeff Shifflett, KC5GVS, 318-239-9724
July 19	Clinton, ME	Maine Council of ARC / Tom Clay, KD1KE, 207-382-6000
July 19	Mio, MI	AuSable Valley ARC / Gerry Volz, WT8G, 517-848-5996 or 517-826-6454
July 19	Frankfort, NY	Utica ARC / Bob Decker, AA2CU, 315-797-6614
July 19	Cary, NC	Cary ARC / PO Box 53, Cary, NC 27512
July 19	Wellington, OH	Northern Ohio ARS / John Schaaf, KC8AOX, 216-323-0081
July 19	Coos Bay, OR	Coos County RC / Hugh Mac Donald, N7OKM, 541-347-7019
July 19	Beach Haven, PA	Jonestown Mt. Repeater Assn. / Charles Hooker, AD3L, 717-864-2571
July 19	Cleveland, TN	Cleveland ARC / David Evans, WD4EZC, 423-472-1421
July 19	Crossville, TN	Plateau ARC / Nick Smith, WA4GKM, 615-484-8220 or 800-774-2623
July 20	Brunswick, MD	Mid-Atlantic DX & Repeater Assn. / 301-416-8447, E-mail: madraclub@aol.com
July 20	Cambridge, MA	MIT RS & Harvard Wireless Club / Steve Fineberg, W1GSL, PO Box 397082, MIT Branch, Cambridge, MA 02139
July 20	Washington, MO	Zero Beaters ARC / Dave Neal, N0PNG, 314-458-3254
July 20	Augusta, NJ	Sussex County ARC / Dan Carter, N2ERH, 201-948-6999
July 20	Van Wert, OH	Van Wert ARC / Robert Barnes, WD8LPY, 419-238-1877, barnesrl@bright.net
July 20	Homer City, PA	Indiana County ARC / Elmer Sorisio, KB3WG, 412-463-1314
July 25-26	Milton, FL	Milton ARC / Mark McAnally, KE4QKN, 904-626-7686
July 25-26	Oklahoma City, OK	Central OK RA / Hal Miller, KB1ZQ, 405-672-7735
July 25-27	Costa Mesa, CA	Intl Radio Club of America Mega-Convention / Mike Sanburn, PO Box 1256, Bellflower, CA 90707, (310) 614-1444 nights / Primarily MW DXing, but all are welcome. / Location: Holiday Inn Bristol Plaza, [714-557-3000 for reservation; mention convention rate of $60] Registration $15; banquet $20 / Station tours, slide show, auction, picnic, etc...
July 25-27	Flagstaff, AZ	Arizona State Conv / John Lanza, KC7IM, 602-440-2039
July 25-27	Richmond, BC, Canada	Pacific NW DX Convention / Allan Buckshon, VE7SZ, E-mail: abucksho@direct.ca
July 25-27	Regina, Sask, Canada	Regina ARA / Doug Richardson, VE5CMA, 306-789-2254
July 26	Pecatonica, IL	Rockford ARA / Marsha Plasters, KB9NGN, 815-399-9233
July 26	Waynesville, NC	Western Carolina ARS / Thomas Queen, K4BNP, 704-258-2639
July 26	Nescopeck, PA	Berwick ARS / Richard Conklin, WC3H, 717-387-6759
July 27	Timonium, MD	Baltimore RA TV Soc / Robert Koblish, N3HAT, 410-467-4634 / Location: Timonium Fairgrounds, York Rd. Talk in 147.03, 224.96 MHz / http://www.smart.net/~brats; email brats@smart.net
July 27	Racine, WI	Racine Megacycle Club / David Voss, WB9USI, 414-554-7565
Aug 1-3	Oshkosh, WI	Fox Cities ARC W9ZL / Location: Pioneer Airport at E.A.A. Fly-In. "On grounds" convention info on 146.520 sim. Op on general phone HF; QSL & SASE to: Wayne Pennings WD9FLJ, 913 N Mason St., Appleton, WI 54914

Send announcements of events or club information to: Editor, Monitoring Times, P.O. Box 98, Brasstown, NC 28902-0098. Fax 704-837-2216; e-mail mteditor@grove.net. See MT's homepage on **www.grove.net** for complete event and club listings.

CLUB CIRCUIT

North American Club Listings F - M

Fire Net: Tom Kravitz, Box 1307, Culver City, CA 90232, 310-838-1436, internet mpage@netcom.com. All of California; fire, EMS, tied in with nationwide notification net.

Fire Notification Network of Michigan: Garry Watts, PO Box 1312, Warren, MI, 48090-1312, (810) 772-4423; firenet@usa.net. Michigan alphanumeric pager net, breaking news via text pager. Customizable Michigan and national options available.

Houston Area Scanners & Monitoring Club: Glen Dingley, 909 Michael, Alvin, TX 77511, (713) 388-1941. 75 mile radius of Houston, TX; scanning & SW. Paging network. *HASMC Newsletter.* Meets Jan & June.

Hudson Valley Monitors Association (HVMA): Patrick Libretti, P.O. Box 706, Highland, NY 12528. Mid-Hudson valley and surrounding counties; VHF/UHF, public safety. *The Hudson Valley Monitor.*

International 11 Meter Alliance: Allen Newton, Rt. 1 Box 187-A, Whitney, TX 76692, (817) 694-4047. Public safety, traffic handling, all bands, esp. 11 meters.

Int'l Radio Club of America (IRCA): Ralph Sanserino, P.O. Box 1831, Perris, CA 92572-1831. Worldwide; BCB/AM DX. *DX Monitor* (34 x) $25 US, $27 Can/Mex, $28.50 ww. First-class stamp or 2 IRCs for sample.

Long Island Monitoring Association: (Replaces Monitoring the Long Island Sounds) Ed Muro, PO Box 308, Cedarhurst, NY 11516-0308. Long Island-Metro NY area; scanning, SWBC, AM-DXing. Weekly net 146.805 8pm Tuesday; net control Ed (KC2AYC) and Frank (N2VRA). To receive free newsletter, hard copy or online, send SASE.

Longwave Club of America (LIMA): Bill Oliver, 45 Wildflower Rd., Levittown, PA 19057, (215) 945-0543. Worldwide; Longwave only. *The Lowdown.* $18 US, $19 Can/Mex, $26 ww.

Memphis Area Shortwave Hobbyists (MASH): P.O. Box 3888, Memphis, TN 38173, Jim Pogue (901)873-4291 or Brandon Jordan 373-8046. Memphis area; SW, MW, FM, TV, utilities, pirates, etc.

Metro Radio System: Julian Olansky, P.O. Box 26, Newton Highlands, MA 02161, (617) 969-3000. New England states; Public Safety. *M.R.S. Newsletter.*

Michigan Area Radio Enthusiasts (MARE): P.O. Box 530933, Livonia, MI 48153- 0933. E-mail xx024@detroit.freenet.org. Great Lakes Region. All bands. *Great Lakes Monitor.* $11 annual US & Canada. $2 sample.

Minnesota DX Club: James Dale, 16330 Germane Ct W, Rosemount, MN 55068. Minnesota and western Wisconsin. All bands. Meets 2nd Friday 7p.m. various locations. *MDXC Newsletter.* Sample SASE. $10 annual dues.

MONIX (Cincinnati/Dayton Area Monitoring Exchange): Mark Meece, 7917 Third St., West Chester, OH 45069-2212, (513)777-2909. SW Ohio, SE Ind., N Ken; All bands. Meets 2nd Sats 7pm. Net Thurs 9:30 145.210/4.610. No dues.

Mountain NewsNet: James Richardson, P.O. Box 4488, Estes Park, CO 80517-4488, (970) 586-4325vx; 4357fax. Colorado statewide. Public Safety notification group. *Mile High Pages.*

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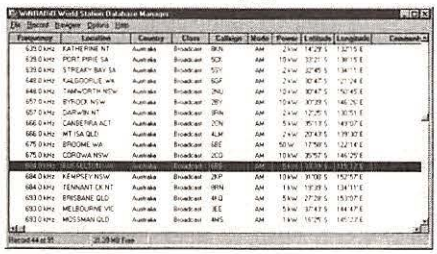

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World Scanner Report, Volume 6, No. 7

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Universal Amateur Radio
Reynoldsburg, OH
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info@winradio.net.au

ASK BOB

ANSWERS TO YOUR RADIO QUESTIONS

Bob Grove, WA4PYQ
bgrove@grove.net

MORE ON "PRIVATE" FCC LICENSE ADDRESSES

In our May issue we (correctly) told a reader that the FCC would not withhold addresses at the request of amateur licensees. Several alert readers have subsequently pointed out that the FCC requires only a mailing address, and it can even be a mail stop. This would certainly protect the privacy of a licensee. As usual, *MT* readers come through!

***Q.** When I hear low band (30-50 MHz) military stations on skip, how large is this "footprint?" Could I still hear it if I moved a short distance away? (Duke Rumley, Madison, NC)*

A. Generally speaking, the ionospheric bounce back down to earth from low-band skip is regional in nature, often covering several states.

***Q.** Most consumer C-band dishes are now made of screen mesh, while commercial dishes are solid. Which has better signal performance? (Fred Pierce)*

A. Size for size, they are equal. The mesh is lighter weight and has less wind load, while the solid dish has stability against deforming under its weight or with wind.

***Q.** On my AM/FM stereo radio, when I tune around 104 MHz FM, I hear strange "Boop-boop" sounds or a high-speed code machine. Nearby I also hear airplane communications. What are the noises? (Bob Brock, Phoenix, AZ)*

A. You are hearing images from strong overload signals on other frequency ranges. The aircraft comms are coming in from the 118-137 MHz band, while the "Boop-boops" are probably from the 152-158 MHz range. By the way, the strange noises are digital paging signals; as you hear the interference, someone is reading a message on his pager display.

***Q.** I have asked this question, and received no reply, twice in a British shortwave magazine, and once of a policeman. Does radiation from a turned-on radio affect the reading on a breathalyzer? (Graham Rankin, Wirral, Eng.)*

A. No. But it's not that simple. There are several types of breathalyzers, some chemical, some electronic, and some laser. One of the newest is sensitive to radio frequency interference (RFI) from nearby transmitters, and signals an alert when misreadings are possible.

***Q.** Have you published any QSLs or verifications from Area 51 (Groom Lake) of the Nellis Range Complex in Nevada? (Donald Michael Choleva, Euclid, OH)*

A. It is not within Department of Defense policy to acknowledge reception of communications related to classified operations; for that reason, QSLs or verifications from these specific classified operations are highly unlikely.

***Q.** What is "M.D.T?" What is needed to monitor this police communications mode? Ken Ballweg, West Seattle, WA)*

A. Mobile data terminals are simply mobile computer terminals designed to exchange their digital text on the same frequency bands used for voice communications. The most common system, the Motorola MODAT, uses a proprietary ASCII code at 4800 baud rate. Because of the nonstandard protocol Motorola has adopted, none of the standard data demodulators presently sold on the hobby market is capable of decoding the transmissions. Encoding/decoding details have, however, been passed on the Internet for stalwart experimenters.

***Q.** In receiver specifications, what is the difference between "triple conversion" and "triple up-conversion?" "Double conversion and "double up-conversion?" (Dave Dube, Windsor, Ont.)*

A. When radio frequency (RF) signals are detected, they are lowered in frequency before the audio is recovered. This is because the necessary filtering required to allow single-frequency selectivity is far easier to accomplish at lower frequencies.

The process is multi-staged to avoid "images," the reappearance of a signal at frequencies other than its actual transmitting fre-

Bob's Tip of the Month

Painless Trunk Tracking

Anyone who has ever tried to follow law enforcement communications on a conventional scanner knows how frustrating it can be. Not only is it difficult to find the next hand-off channel, but the buzzes, chirps, and beeps associated with trunked radio systems are particularly aggravating.

Veteran scanner enthusiast John T. Ward recently shared a listening tip to minimize those annoying noises. Since these noisy artifacts are primarily added to the repeater outputs, listen instead to the repeater *input* frequencies. While the dispatcher will not be heard, the action is at the scene anyway.

Since the low power mobile and handheld units will be harder to hear, a good outdoor antenna is recommended.

quency. This artifact may be substantially reduced by up-conversion, whereby the original signal is first converted to an even higher frequency, then down-converted again.

For example, in the new Alinco DJ-X10, conversion frequencies are typically 736.25, 45.05, and 0.455 MHz before audio recovery. This would be a classic case of triple up-conversion. On lower cost radios it is more economical to do it with only two steps (double conversion).

Triple up-conversion may sound like the signal frequency is raised three times, but it is actually raised only once, then down-converted. Perhaps it would be more correct (but more unwieldy) to say, "single up-conversion plus double down-conversion!"

Q. Is it possible to convert an old cellular telephone to a wide-frequency-coverage receiver for reception of noncellular services? (Robert Brock, Phoenix, AZ)

A. Not practically. While it is theoretically possible, all of the subcircuits in modern cell phones are dedicated to the 825-849/869-894 MHz cellular frequencies. Frequency synthesizers, filters, tuning steps, demodulators, and other stages are optimized for cellular.

Q. Is there a wideband signal booster for shortwave and scanner listening that separates the signal from the noise? (Ken Ballweg, W. Seattle, WA)

A. No. A wide bandwidth preamplifier is very easy to make using modern monolithic microwave integrated circuits (MMICs), but usually disappointing to use. Without frequency limiting, it is vulnerable to overload throughout its entire range; this means that a strong shortwave signal could compromise scanner reception, and vice versa. Even if it doesn't degrade the preamplifier, the extra boost in unwanted ranges can cause overload interference to the host radio.

Finally, even with the most modest shortwave antenna a few feet long, a preamp doesn't help reception on modern, high sensitivity scanners, it simply amplifies noise right along with the signal. The net result would be the same as simply turning up your volume control!

Q. I read in an old book that an incoming tornado can be detected by listening to the low end of a medium wave radio (around 530 kHz) or watching the picture on channel 2 of a TV receiver. Is this a better guide than following weather broadcasts? (Graham Rankin, Wirral, Eng.)

A. Both techniques make use of the fact that a cyclonic storm (tornado) is filled with lightning discharges of wide frequency bandwidth which may be detected for great distances on their lowest frequencies. This phenomenon manifests as a continuous increase in background noise. On the AM radio, this would be heard as a substantial increase in static crashes as the storm grows nearer, and on TV, the raster (background glow) becomes brighter.

The problem is that this is a qualitative, not quantitative, approach to storm detection. We only know that the system is growing steadily worse, but you can see that out the window! I would use this technique for your amusement and edification, but depend upon your local weather service for frequent updates and short-term forecasts during a storm.

Questions or tips sent to "Ask Bob," c/o *MT* are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of *MT*, or e-mail to **bgrove@grove.net**. (Please include your name and address.) The current "Ask Bob" is now online at our WWW site: **www.grove.net**

INDEX OF ADVERTISERS

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Monitoring Times assumes no responsibility for misrepresented merchandise.

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RC-740X, band expansion for KENWOOD 741/742 series, ScannerWEAR WINDOWS software for ICOM, AOR, OPTO receivers. See all at http://www.radioscan.com R.C.S.I. M-F 9-4 PST, 1-800-560-7234.

NEW BLACK BOX ANTENNAS! Tunable rectangular loops with twice the output of the originals. Black Box Antenna, 14624 Deon Drive, Sonora, CA 95370. (209) 533-2865.

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WANTED: Panasonic RF 2200 receiver. Mint only. Top $. Harrison 24 hour voice mail. (513) 977-3153.

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ICOM R7100 full coverage scanner. Like new. Call Dan after 5pm ET. $1100. (215) 957-2343.

MONITORING TIMES, January 1992 through December 1996. Complete set, 60 issues. $120 includes shipping in continental US. Marty (908) 735-0777.

WATKINS JOHNSON HF 1000 Version 4.01 $2800.00; Shinwa SR001 $350.00; Grundig Satellit 700 with full memory $300.00; Icom 71A with FL33 $550.00; Universal M-8000 Version 5 $895.00; Lowe HF 150 with PR-150 Pre-Selector plus carrying case $625.00; Grove SP-200 Sound Enhancer $150.00; MFJ-209 HF/VHF SWR Analyzer $70.00. All units in excellent condition; no personal checks or COD. Frederick F. Nagle (914) 234-6753.

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AR2515 Scanner, 5-1500 MHz uninterrupted, 1984 channels, includes PC software, mint. First $375.00. Keith (407) 260-6027.

PRO-2006, 25,600 channels, box and manual, excellent condition, $275 OBO. David (901) 847-9870 after 5 CDT, davew13@aol.com.

SONY SW-1S Micro $150. Panasonic RFB-65 SSB $140. ICOM TV-R7100 video-stereo $150. Each cosmetically perfect. WB9YCJ/6, (714) 564-9010.

(Letters, continued from Page 4)

stereo stations would come and go fast as the toll plazas. So when I retired to the back seat to rest, I decided it was time to bring out the Sony and my copy of *MT* (wouldn't go anywhere without it!). I finally had some time to do some East Coast mobile DXing. Using the '2001 with its whip antenna fully extended in the back seat, the results were dismal, except for the high pitch of the engine racing. Then WHAM!, the whip antenna came in direct contact with the car's rear window defroster grid! Thank goodness it was summertime and not in use.

"BOOM, in came the world on the 80, 40, 31, 25, 9, and 16 meter bands. Hams were hard in both AM and SSB. England, Russia, Switzerland, Germany, Poland, Japan, and Australia came in with all lights lit up in the S-meter. I was amazed at both the clarity and minimal fading that I experienced. This proved to be a very unique use for an otherwise inactive automobile accessory."

George Appleton of Las Vegas, Nevada, thanks *MT* for pointing him to the book, *Essential Radio: The Traveler's Guide to AM & FM Stations in the United States*, published by Peregrine Press.

"I've looked for something like this for some while, to replace my old *White's Radio Log* of AM and FM stations. Got a copy yesterday at the local bookstore.

"It's good to have along when we're vacation-driving, and at home here I have a DXing antenna made up of a metal Slinky stretched under the eaves on 10 ft. of PVC pipe, with a wire coming to an induction coil which is then grounded. Works great."

Need a vacation? Why not send your radio to DX camp?! We'll do that and more next month in the search for the best in monitoring times!

—Rachel Baughn
mteditor@grove.net

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CLOSING COMMENTS

By Bob Grove, Publisher

Farewell to a Friend

It was 1950. A twelve-year-old boy, brimming with enthusiasm over electricity and electronics, was perusing the archaic books on radio adorning the shelves of the Rocky River (Ohio) Public Library. Dave Crossley, W8BCO, a veteran ham even then, walked by and asked the boy what his interests were. "These books are quite old," Dave said. "If you are really interested in radio, perhaps you would like to see an amateur station in operation."

The boy was awed by the prospect, and the demeanor of the quiet, reserved, contemplative ham was reassuring. A date was set for the following week, after school.

Dave's ham shack was typical of the era — a converted BC348Q Navy receiver and a home-made, two-tube CW transmitter; either could be connected to the backyard wire dipole by a porcelain-base knife switch. A straight key awaited the proficient fist of the articulate ham.

The bright dial lamps illuminated the wedge-shaped dial of the old, black-wrinkle-finish BC348Q as Dave carefully turned the crank-handle tuning knob. The warm, red-orange glow of the transmitter tubes radiated a visible message of readiness.

Soon a di-dah-dit sound emerged from the speaker. "That's a 'W3,'" announced Dave; "He is probably in Pennsylvania or Delaware." The young lad was amazed. How did Dave know that just from those brief sounds?

As the months passed, the young student learned much about electronics from Dave, who had infinite patience with the boy's myriad questions and stumbling progress. Like the time he tried building his first transmitter using acid core solder, watching it rust before his very eyes; or the time he plugged his brand new multimeter into the AC wall socket to see how many ohms were in the line, just to see the meter vaporize in front of him!

But Dave came to the rescue, showing the young explorer not only how to build a transmitter using rosin core solder, but how to make a multimeter out of junkbox parts as well.

Within a few months the eager student had successfully passed his Novice Class license test. Every day, waiting for school to end, he raced home to check the mailbox. Finally, after six weeks, there it was! Opening the prize envelope he saw his new callsign: WN8JHD!

A quick telephone call to Dave arranged an immediate schedule; 3721.5 kHz seemed like a good frequency — after all, it was right in the middle of the new 80 meter Novice band.

The boy's hand was shaking almost uncontrollably as he grasped the key the way his mentor had shown him: thumb and middle finger at the edges, index finger pressing down. "Di-dah-dah;" slowly he sent the callsign — filled with errors. "Di-di-di-di-di-dit;" the error correction burst meant starting the words all over again. Patiently Dave responded, his fist rock-steady from years of Morse on the competitive ham bands.

Soon the budding ham gained experience and proficiency, discovering other modes of operation as he successfully passed his Technician, General, and eventually his Advanced Class as well as Commercial Class licenses. He even threw in CB, licensed first as 19A7074, then KOP0205, to regain the right to operate on the 11 meter band recently lost by the hams to that new service.

Little did the boy know that his nurturing experience would lead him to a profession in radio and electronics, founding a leading supplier of radio equipment and supplies, and publishing two leading magazines for the radio market.

Dave Crossley died April 26, 1997. I'll miss you, Dave, and I will never be able to thank you enough for your patient guidance.

Catch MORE Listening Excitement!

PC Programmable for Total Scanning Control!*

Using a PC and available third party FCC Master File licensee database info (on CD-ROM or HD Disks), quickly customize your IC-R10 to scan only the active channels you want—anywhere in the country! ICOM's CI-V computer interface is built right in! You can also quickly clone data from PC to IC-R10, or from one IC-R10 to another.

with select ICOM options

Advanced Operation in an Easy to Use Package!

- Beginning listeners can start out using the IC-R10's ***easy mode:*** select 1 of 10 band scan programs set by ICOM's factory. As your listening preferences grow, the scans can be changed to follow the listener's desired settings!

Actual Size!
2.3"(w) x 5.1"(h) x 1.2" (d)

Uses Ni-Cd, Alkaline or other DC Power**

The IC-R10 comes with a battery pack that uses either "AA" alkalines or the ***included "AA" Ni-Cd batteries****. For frequent listeners, use the right-in-the-radio rechargeable Ni-Cds (AC wall charger plug also included). Infrequent listeners may prefer using alkalines for their long power storage capacity. Or use an external DC power source, like a car cigarette lighter!*

Next Generation Features for the Serious Listener!

- ***7 different scan types*** with ***priority watch*** include the all ***new "signal navigation" (SIG NAVI) scan.*** While you listen to a paused frequency, the SIG NAVI scan looks for the next busy frequency (within ± 100 kHz)!
- ***Tuneable bandpass filters*** provide excellent image reception and help reduce intermod.
- A ***built-in 20 db attenuator*** helps block unwanted noise.

- A ***"real-time" band scope*** makes it easy to find busy frequencies and to note band conditions. *A handheld first!*
- The ***alphanumeric dot matrix display*** allows up to 8 characters per channel name and up to 10 characters per bank name.
- Large ***36mm† speaker*** for loud, crisp audio.
- ***1000 memory channels*** with an EEPROM. Memories are arranged in ***18 banks of 50 channels***, with 100 channels for auto memory write and program skip scan.
- Noise blanker, lock, sleep timer, auto frequency control (AFC), & more!

Impressive Specifications!

- ***Wide band performance!***
  500 kHz – 1.3 GHz coverage††
- ***All Modes, including SSB for SWL's***
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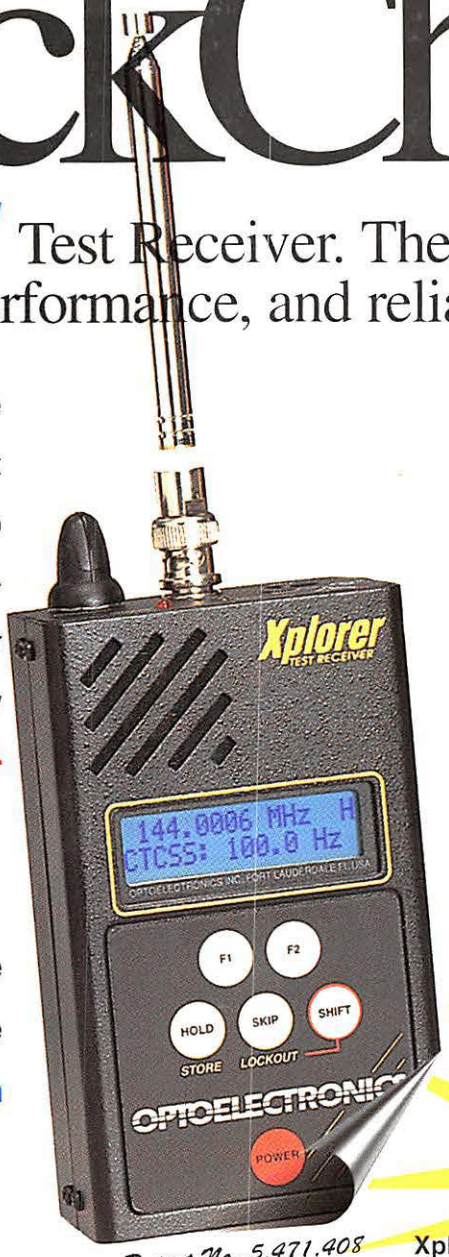
Contact ICOM Technical Support in the HamNet forum on CompuServe® @75540,525 (Internet: 75540.525@compuserve.com). * Various options required, depending on PC or cloning task performed. ** Depending on type of external 4 V to 16 V DC power supply, either option CP-12L or OPC-254L required. † Measured diagonally. †† Cellular blocked; unblocked version available only to FCC approved users.

QuickCheck

The Xplorer Test Receiver. The professional choice when speed, performance, and reliability are an issue !

For Commercial and Mobile Radio testing, the **Optoelectronics Xplorer** stands alone. Let the Xplorer perform all your quick radio checks, instantly determining the radio's frequency, **CTCSS, DCS, DTMF**, deviation or signal strength. The Xplorer automatically locks on to any nearfield signal from **30MHz - 2GHz** in less than a second.

There is **no setup necessary**-Whether you're in the field or in the shop, the Xplorer is the portable, compact and **economical solution** for any two-way communications business.



Patent No. 5,471,408

FEATURES

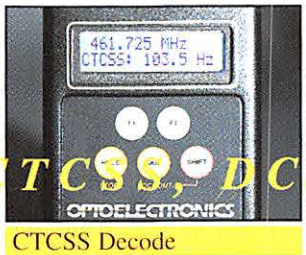
- Nearfield receiver, sweeps **30MHz-2GHz** in <1 second (Cellular bands are blocked on all U.S. versions)
- Decodes **CTCSS, DCS,** and **DTMF**. Manually record tones into memory
- Lockout up to 1000 frequencies
- Store **500 frequencies** in **memory** with time & date stamp, as well as number of hits per frequency
- NMEA-0183 **GPS interface** for recording Latitude & Longitude coordinates (GPS Required)
- **VFO mode** for tuning to specific frequencies
- PC interface for **downloading** data from **memory**
- FM demodulation / **Built-in speaker**
- **Auto** or manual frequency **hold**
- **Maximum nearfield** reception / Up to **1/4 mile** away

$899

Summer Special Includes: Spectrum CD & CC30 Case

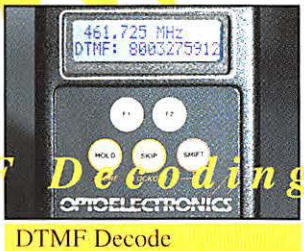
Xplorer includes: TA100S antenna, NiCads, Charger, PC Download cable and software

SPECIFICATIONS	
Freq. Range	30MHz - 2GHz
Modulation	FM Deviation
Freq. Response	50 - 3000Hz
Auto Sweep Time	<1 second
Input 50 Ohm	-59dBm @100MHz -25dBm @1GHz
Display	2 line LCD
Power	Internal NiCad



CTCSS Decode

DCS Decode



DTMF Decode

CTCSS, DCS, and DTMF Decoding

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